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LEE COUNTY, MISSISSIPPI SOLID WASTE DISPOSAL PROJECT

Lee County Board of Supervisors
Tupelo, Mississippi

1974

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Lee County, Mississippi, with the aid of an EPA grant, has demonstrated a unique county-wide approach to rural solid waste collection and disposal. Many of the smaller secondary roads in the county could not be safely traveled by a large packer truck. However, by placing wheel-and-axle-mounted mobil waste containers in areas with these roads, collection service could be provided to rural locations. On collection day, a pick-up truck would tow the mobil containers to a predetermined point for emptying by the packer truck. Standard stationary containers are utilized along improved roads. The final report on this project describes the system, documents the implementation problems and provides cost data.

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LEE COUNTY, MISSISSIPPI SOLID WASTE DISPOSAL PROJECT

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U. S. ENVIRONMENTAL PROTECTION AGENCY
1975

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LEE COUNTY, MISSISSIPPI, SOLID WASTE DISPOSAL PROJECT
DEMONSTRATION GRANT NO. G06-EC-00315
FINAL REPORT

Lee County Board of Supervisors
B. G. Coggin, Jr., Project Director

SUMMARY

To undertake the task of cleaning Lee County of its many roadside dumps and its increasingly littered highways and landscapes required much research, planning, and personal determination on the part of many. It was an apparent fact that Lee County, located in the hills of northeast Mississippi, was fast becoming a litterbug's paradise. Open dumps were flourishing due to the fact that no other suitable method of solid waste disposal was available. As will be shown in the following detailed report, litterfree roads and highways are not impossible, but much effort by all is required for success.

Thanks to the concern of many citizens and the Board of Supervisors, a county-wide approach to rural solid waste collection and disposal has been initiated. This system basically consists of a containerized collection program coupled with a single sanitary landfill disposal method.

The collection system consists of stationary waste containers on the major highways and wheel and axle mounted mobile waste containers on the smaller secondary roads where the large packer truck which empties this container could not safely travel. These mobile containers

are towed by pickup truck to a predetermined point for emptying by the packer truck. This unique method of solid waste collection was the basis for the solid waste demonstration project initiated in Lee County.

The collected refuse is brought to a single sanitary landfill site located near the center of the county for proper disposal. In addition to rurally generated wastes, numerous manufacturing companies and private individuals bring loads of solid wastes to the landfill daily.

After an initial study on solid waste generation rates in Lee County, it was found that rural residents produce approximately two pounds per person in each household per day. In cities where commercial and industrial wastes are considered, the weighted average increases to approximately 4.55 pounds per person per day. From these figures, we can see the large mass of solid waste accumulating daily from Lee County's 46,000+ people.

Collection and disposal of these wastes proved to be a costly project. Statistics for the period of operation, June, 1971 through August, 1973, give an average cost of $11.94 per ton for collection and $4.33 for disposal into the landfill. This gives a combined average cost of $16.27 to collect and dispose of each ton of solid waste in Lee County thus far. Records show these respective costs to be decreasing as more tons are being collected and disposed of each month with overhead costs being relatively stable. For the past year of operation, respective costs for collection and disposal were $9.56 and $3.75, showing a decrease in operational costs. These costs appear to be representative with a more or less stable point being reached due to relatively fixed overhead costs.

To date, rural Lee County residents have enjoyed a convenience to which they were not accustomed. Statistical surveys have shown the public to overwhelmingly approve the present method of solid waste handling over previous methods. This project has opened the public eye to the formerly increasing number of unauthorized roadside dumping areas and the related sanitation problems. This project has shown Lee Countains that a feasible approach to county-wide solid waste collection and disposal does exist and can be initiated in any county if the people are oriented toward environmental improvement and willing to work and pay for it.

To date, all of the 225 open roadside dumps in the county have been rehabilitated by the county forces and interested citizens working to improve the appearance of their neighborhood. Also stricter enforcement of anti-litter laws has been initiated with several convictions reported to date. This strict law enforcement is an integral part if the program is to remain a success.

At present, the rural residents and all of the municipalities are fully utilizing the county's solid waste system. A second packer truck and additional containers along with three new rear loading packer trucks bought by the county with the help of the Appalachian Regional Commission for door to door municipal collection have been put into service in order to strive for 100% involvement in the solid waste system by all people in Lee County. It is hoped that in the near future, every single pound of solid waste generated in Lee County will eventually find its way into the Lee County landfill and not be scattered along the highways to destroy the beauty of nature and peril the future of our environment.

INTRODUCTION

Lee County lies in the northeastern part of Mississippi, about 35 miles south of Tennessee and 20 miles west of Alabama (See Figure One). The County is roughly rectangular in shape measuring 30 miles north to south and 16 miles east to west. Lee County is bounded on the north by Prentiss and Union Counties; on the east by Prentiss and Itawamba; on the south by Monroe and Chickasaw, and on the west by Pontotoc and Union Counties. Its boundaries enclose approximately 455 square miles with eight (8) incorporated towns located among its wooded hills.

The incorporated towns are Tupelo, the county seat, which had a 1970 population of 20,471; Baldwyn with 2,366, lying partly in Prentiss County; Nettleton with 1,591, lying partly in Monroe County; Verona with 1,877; Plantersville with 910; Shannon with 575; Saltillo with 836; and Guntown with 304. This gives a total incorporated population of 28,930 or 63 percent of the 1970 totals. This leaves 17,218 or 37 percent of the county's 46,148 people in predominantly rural areas. Comparison with 1960 census figures gives a decrease of rural population of eight percent (8%) with the towns gaining this movement along with most new additions to the county's census counts. The rural populations stood at 58 percent in 1950 and 67 percent in 1940, giving an indication that the rural population is approaching a stable figure in absolute numbers in the near future. The population in the incorporated areas is expected to grow at even greater rates in the future due to industrial expansion creating new jobs. This will be especially true in the smaller towns surrounding Tupelo which afford convenient living areas for workers commutting to Tupelo factories. These towns such as Plantersville, Verona, and Saltillo have shown remarkable growth rates during the past ten years.

In times past the people of Lee County were to a large extent dependent upon agriculture as a source of income. Thanks to the foresight and initiative of many of the early leaders, the Tupelo area is now the envy of many areas in the southeastern states. In recent years, a variety of industries have moved to Lee County offering employment for the displaced agricultural workers. Lee County also can expect future industrial development when the long awaited Tennessee-Tombigbee Waterway becomes a reality.

The governing body in the County (other than municipalities) is the Board of Supervisors. One supervisor is elected from each of the five districts or beats. Each supervisor is elected by popular vote of the district in which he is a candidate; he must also reside in the district he represents.

The functions of the Board of Supervisors are wide and varied. Each supervisor is responsible for maintaining the rural roads and bridges in his district, though most plans are approached on a county-wide basis. The Board of Supervisors is directly responsible for all programs and functions in the county except for the municipalities, which gives an indication of the power and influence held by the Board.

Like many other neighboring counties, Lee County's solid waste problem had become acute. Wastes were being collected in most municipalities house-to-house and disposed of by depositing in open dumps and, in practically every case, burning. Rurally generated wastes were the individual owner's problem; he usually tried to dump it on someone else's property unless he had a suitable gully or hole that needed filling. This waste was usually pre-burned in barrels before disposal, a minor contribution to air pollution. The rural householder could not be held entirely at fault, however; he had very little choice due to the non-existence of suitable disposal sites.

Current studies on per capita solid waste generation rates done by the Mississippi State Board of Health give an average of about 5.5 pounds per person per day of solid wastes in the State. These figures are based on national trends in solid waste generation and are not weighted averages. This figure drops considerably in a strictly rural situation due to burning of the wastes, the absence of industrial and commercial wastes, and also the difficulty in obtaining accurate measurements. Similar studies done by the county's engineering staff gave generation rates similar to this ranging from 2.2 pounds per capita per day in rural areas to 6.4 pounds in Tupelo with a weighted average of 4.55 pounds for the entire area. This figure is growing and expected to grow each year as industrialization brings more solid wastes into the area.

These generation figures take on a more serious light when some manipulations are made. The Lee County population of 46,148 times 4.55 pounds per person per day gives the astounding total of almost 210,000 pounds of solid wastes per day accumulating in Lee County. It is evident that a large volume of solid wastes such as this presents a considerable problem of disposal. A simple example to help visualize this amount of wastes would be to take all of the solid waste generated in the Lee County area during 1970 and confine it to a ten-acre tract. This would cover the ten acres with almost 25 feet of uncompacted refuse.

As mentioned earlier, all of the municipally collected wastes were subjected to open dumping and burning which contributed to a myriad of undesirable conditions. These burning dumps created offensive smoke and odors as well as producing safety hazards with the many broken bottles and sharp objects scattered throughout the refuse. It should be noted that these dumps were not considered off-limits to anyone; scavenging was unofficially permitted but was not a problem. Also the dumps were a virtual haven for flies, mosquitoes, and other insects as well as rats and other rodents. These adverse sanitary conditions alone were enough to cause much concern among health officials and interested citizens. It seems that with our modern modes of living and great advances in technology such atrocious eyesores as city dumps with all their undesirable accompaniments could be eliminated.

Generally speaking, the existing collection services offered in Lee County were very poor. Only about one-half of the total number of families in the County had collection service. The majority of the municipalities offered some type of refuse collection at a charge to the customer, but some had no collection service whatsoever. One can imagine the undesirable task confronting a householder who owns only a 100-foot front lot and approximately two pounds of solid waste for each person in his family piling up on him each day. This is the primary reason for the initiation of roadside dumps due to the non-existence of suitable disposal sites.

These dumps, authorized or not, continued to grow in ever increasing number. (See Figure Two) Aside from public nuisances, they were illegal according to current Mississippi laws which forbade the dumping of solid waste on public or highway property. These offenses are punishable by fines in every case. This law was pretty much ignored by everyone, however, due to the difficulty encountered in legal disposal. It seemed that every method of disposal in Lee County was unsanitary, unhealthy, undesirable, unpleasant or illegal.

This situation naturally led the governing body, the Board of Supervisors, to seek a route of redemption. A total of over 200 unauthorized dumps existed alongside the county roads in addition to the various municipal dumps. Figure Three shows these dumping areas which have since been rehabilitated by the county and its forces.

Realizing the complexity of the problem as well as the need for professional consultation, the board contacted the County Engineer for help on the problem. He and other members of his staff embarked on a detailed study of the solid waste problems in Lee County seeking possible solutions and proper management. This study was supported in the major part by a federal grant from the Office of Solid Waste Management Programs, Environmental Protection Agency. This study was done in order to determine the quantity as well as the composition of Lee County's solid wastes. This would give indication as to the amount of land needed for a landfill site, the equipment required, and the manpower needed to accomplish the objectives set forth. Some findings included generation rates, existing collection and disposal facilities, comparative criteria on alternate systems as solutions, and recommendations for solving the problem. Further details can be found by reference to Solid Waste Management Study-Lee County, Mississippi, by Cook Coggin Engineers, Inc., Tupelo, Mississippi, dated April, 1970.

This study gave the sanitary landfill disposal method as the most practical means of solving Lee County's solid waste disposal problem. Land, personnel, and equipment costs prohibited the use of more than one landfill; therefore, a means of delivering the collected solid waste to a single landfill site had to be chosen. It was evident from generation rate figures that a large packer truck of approximately 30 cubic yards capacity would be required to handle the large volume of wastes without unnecessary shuttling back and forth to the landfill. This apparent solution shed light on a new problem. That is, Lee County is blessed with a very good network of primary roads and highways over the entire county; however, most roads and bridges of the secondary county system were not sufficiently designed to accommodate the load that a large packer truck would impose on them. This required further consideration as to how the rural wastes would be collected and delivered to the landfill.

The answer to this question paved the way for a solid waste demonstration project for Lee County. The primary roads and highways that could stand the load of a large packer truck would be equipped with stationary metal containers that could be emptied by the packer truck. The secondary rural roads would be equipped with mobile containers; i.e., stationary containers mounted on wheels. This unique feature of rural solid waste collection was the basis for Lee County's Solid Waste Demonstration Project. These mobile containers would be towed by a pickup truck to a predetermined point where the packer truck would stop and empty them as the mobile containers were being brought to the various predetermined emptying points decided on by the collection personnel, the packer truck would be stopping along the route emptying the stationary containers as he came to them. This arrangement proved to be very desirable in that no appreciable time was lost by either parties during the course of the day. This seemingly solved the overloading problem of roads and bridges by the packer truck, thus affording a much needed service to rural residents.

Specific objectives were set up by Lee County which included demonstration of the feasibility of a county-wide plan of solid waste collection and disposal by a centrally-located sanitary landfill; proper refuse collection in each small municipality in the County by use of county-owned and operated packer trucks, with the towns bearing the labor costs; provide solid waste disposal methods for rural residents, and eliminate open-dumping, burning, and accompanying pests associated with dumps. This would be contingent upon proper training of the personnel who will be responsible for operation and supervision of the solid waste storage, collection, and disposal program. This demonstration project was supported in the major part by a federal grant from the Office of Solid Waste Management Programs,Environmental Protection Agency. This project is anticipated to be of possible assistance to similar counties who wish to initiate solid waste disposal programs. It was in this light that the project of cleaning Lee County was developed.

CONCLUSIONS AND RECOMMENDATIONS

With almost three full years of experience in solid waste collection and disposal, Lee County officials realized among other things, that the solid waste business was expensive and time consuming. Some other important points should be made, also, concerning the feasibility of providing a county-wide system for collection and disposal of solid wastes. Even with limited experience in this system, its benefits are already beginning to present themselves. It should also be added that some problems must accompany any worthwhile endeavor.

For any project whose success depends upon public approval and use, the related parties must be educated to the proper aspects of its design as well as to the goals that are hopefully to be accomplished. Simply because one puts a green colored box on the side of a highway does not mean that everyone will instinctively put all their trash and garbage into it. They either must be informed of its purpose or see someone else in the old "monkey see-monkey do" sort of way.

This is at times a problem in itself. During periods of rainy weather, or if the container is relatively full, some people will not try to put their refuse into the containers. They only place it beside or on top of the container. This becomes susceptible to stray dogs and cats to scavenge through. It would appear that well constructed container sites would be a help in this case. For this reason, it is recommended that container sites be paved if at all possible. This will assist the housewife who doesn't want to drive or walk through mud to a container. A clean paved site would welcome use much more than a muddy, wet and littered site. This would also stimulate people to keep the sites cleaner - "litter breeds litter". A person would be less likely to carelessly litter a neat paved site than one giving an unkempt appearance.

It should be noted that some people will not use a system such as this no matter how well informed they are of its merits. It is unfortunate that some people must be forced by law to obey littering rules or roadside dumps will continue. For this reason, a stiff penalty is recommended for the habitual litterbug who persits in dumping his refuse on public or private property other than his own. It is imperative that the public is informed from the outset of a project such as this in order for it to be a success. Methods used by Lee County for public education will be discussed later in this report.

Another important factor to be considered in implementing a county-wide solid waste collection and disposal facility is economy. No project is a success if it presents too large a financial burden; i.e., it must be practical. This aspect is further discussed in later sections of this report.

To determine the economic practicality of such a system, each load of refuse brought to the landfill must be weighed and recorded. This is done to compare with the associated costs incurred in collecting and disposing of the waste in order to develop a cost per unit of weight for the accumulated materials. Since there is no direct charge levied for placing solid waste materials in the landfill, weighing is not needed to establish an equitable charging basis; however weights of incoming refuse are desirable to develop per capita generation rates, design landfill capacity, and give indication as to equipment needed for collection and disposal. This practice has now been stopped for a while. When Tupelo and the other towns became involved in the system, then traffic was so frequent into the landfill site, that the weighing operation was a major constriction to the smooth flow of vehicles in and out of the landfill. For this reason weighing was discontinued. If for any reason, it should become necessary then weighing operations could resume.

From data gathered before weighing operations ceased, average waste densities in the 5.5 cubic yard containers of approximately 140-150 pounds per cubic yard (less container weight) were computed. In addition, generation rate figures ranged from 1.5-2.5 pounds per capita per day. This figure is very inconclusive due to the wide variance of people using the system of containers. That is to say, not all of the refuse placed in the containers was from strictly rural sources. It was found that the packer trucks averaged two trips to the landfill daily to empty with an average of seventeen containers per truckload or thirty-four containers per day per truck. It is found that each truck empties an average of 14,000 pounds per load. Multiplying this by an average of four loads per day for the two trucks gives a total of 56,000 pounds. This represents sixty eight containers (17 x 4) for an average of 823.5 pounds per container or 149.7 pounds per cubic yard. These figures represent weighted averages of loads brought into the landfill by the packer truck serving rural, some municipal, and other miscellaneous containers. Dividing the 56,000 pounds per day by approximately 20,000 people served gives an average of 2.8 pounds per person per day generated. This compares favorabily with assumed and computed figures in other areas of the study.

It is felt that participation in the program is such that approximately 99% of waste generators do actually use the system. This figure is assumed to be a stable one with the apparent non-use of roadside dumping areas.

To give an indication of the actual costs for collection and disposal of solid wastes in Lee County, figures for the period of operation were compiled and compared as follows:

TABLE 1

STATISTICAL RESULTS OF COLLECTION AND DISPOSAL COSTS

	Total Tons Weighed * (Disposed)	Total Cumulative Tons Weighed (Disposed)	Total Tons Collected	Total Cumulative Tons Collected	Collection Cost/Ton	Landfill Cost/Ton
June 1971	168	168	58	58	$62.62	$14.14
July	315	483	136	194	23.84	7.49
August	357	840	158	352	20.98	7.41
September	330	1170	148	500	22.66	7.27
October	351	1521	148	648	24.08	9.27
November	310	1831	175	823	21.41	8.96
December	443	2274	227	1050	14.99	6.12
January 1972	642	2916	227	1277	15.34	5.27
February	434	3350	205	1482	20.69	6.07
March	682	4032	266	1748	15.24	3.53
April	1003	5035	257	2005	15.98	5.21
May	770	5805	352	2357	10.93	4.12
June	733	6538	354	2711	13.63	3.99
July	683	7221	404	3115	11.70	5.18
August	1122	8343	462	3577	11.28	2.83
September	1168	9511	454	4031	9.33	3.24
October	1134	10645	504	4535	9.17	3.40
November	1141	11786	485	5020	8.78	2.73
December	1016	12802	568	5588	8.11	3.76
January 1973	1115	13917	585	6173	9.02	3.45
February	1100	15017	521	6694	10.42	10.34

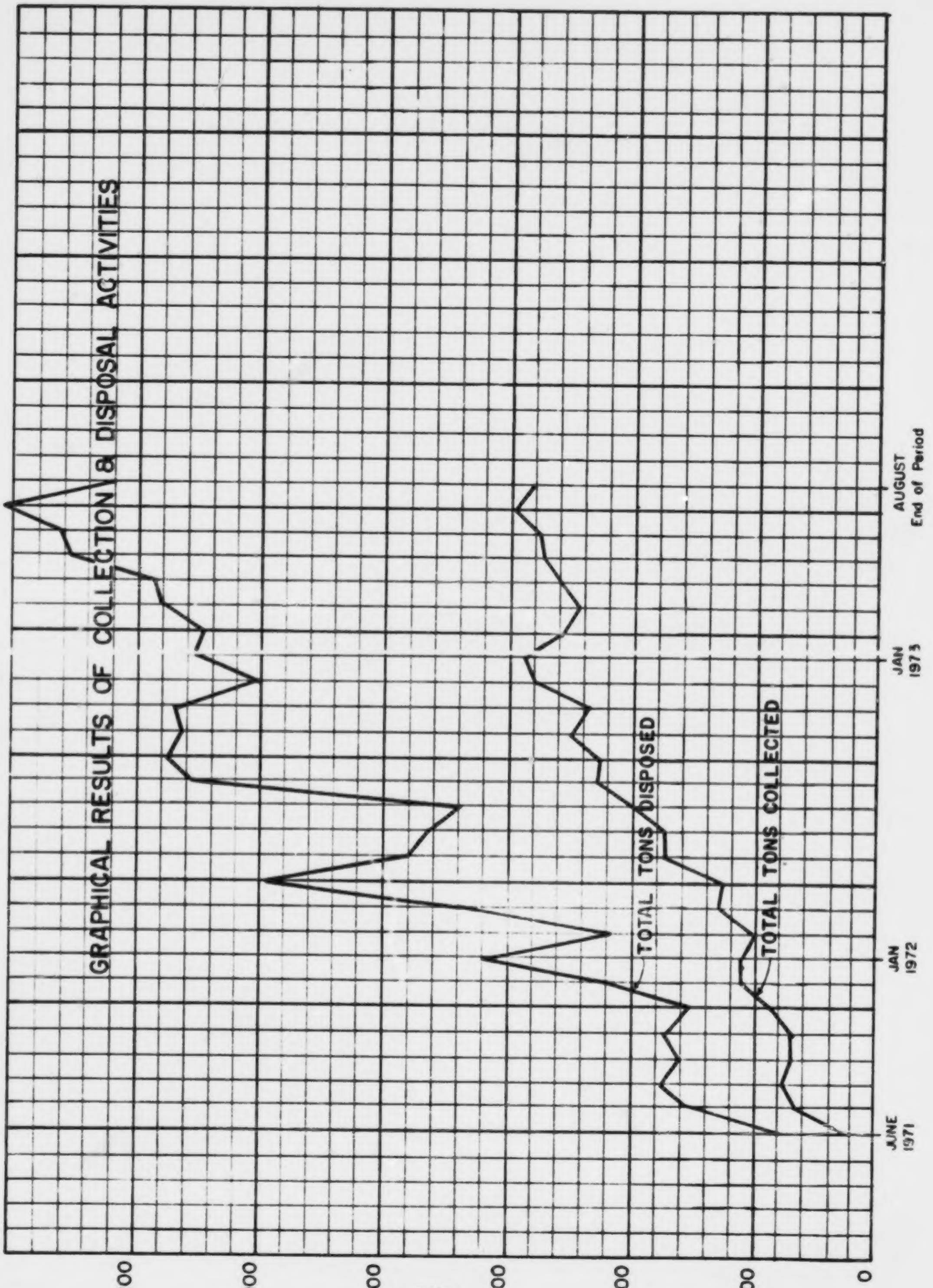
* Includes waste collected by private haulers

TABLE 1 - CONTINUED

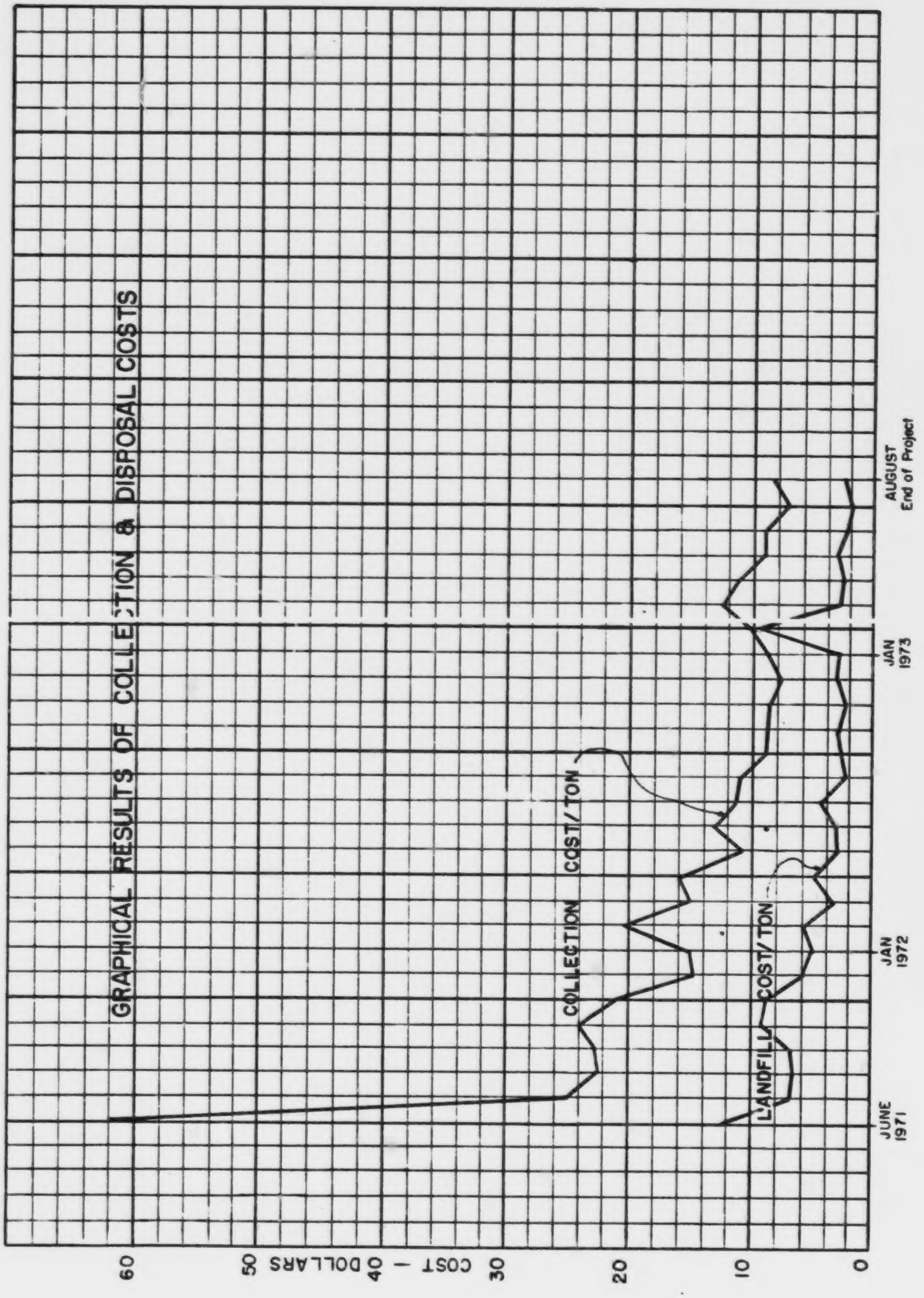
	Total Tons Weighed (Disposed)	Total Cumulative Tons Weighed (Disposed)	Total Tons Collected	Total Cumulative Tons Collected	Collection Cost/Ton	Landfill Cost/Ton
March	1167	16184	491	7185	$12.95	$3.48
April	1179	17363	522	7707	11.94	3.03
May	1307	18670	555	8262	9.21	3.86
June	1330	20000	559	8821	9.22	2.58
July	1403	21403	601	9422	7.70	2.32
August	1237	22640	575	9997	8.90	2.81

From the previous chart one can easily see that the total number of tons collected and disposed by county forces increased steadily over the period. Also the unit costs came down on an equally steep scale. This can be seen graphically by reference to Graphs 1 and 2 which depict the landfill and collection activities on a graphical scale (Graph 1) as well as the respective costs incurred for each (Graph 2). The unit costs will tend to decrease to a certain point due to the relatively fixed overhead costs; therefore, it is imperative to strive to somehow get every possible ton of solid waste in the county to the landfill.

Since very few collection and disposal methods existed before the demonstration project, little could be said about improvements over existing systems. The demonstration project affords a much needed service to all rural citizens who before had no means of waste disposal that was ecologically practical.


GRAPHICAL RESULTS OF COLLECTION & DISPOSAL ACTIVITIES
TOTAL TONS DISPOSED
TOTAL TONS COLLECTED
TONS
1200
1000
800
600
400
200
0
JUNE 1971
JAN 1972
JAN 1973
AUGUST End of Period

GRAPH I


GRAPHICAL RESULTS OF COLLECTION & DISPOSAL COSTS
COLLECTION COST/TON
LANDFILL COST/TON
COST — DOLLARS
0
10
20
30
40
50
60
JUNE 1971
JAN 1972
JAN 1973
AUGUST End of Project

GRAPH 2

Experience has suggested several modifications of the system even though the system is relatively new. It proved best to locate container sites near a lighted area or residence in order to discourage vandals from stealing or damaging parts on the containers although this problem virtually eliminated itself when people realized the importance of the containers and also the novelty wore off of vandalizing them. Particularly vulnerable items are tires on mobile containers. In addition, these tires should not be tubeless but tube type to prevent leakdown due to extended periods of inactivity. Another suggestion is to keep mobile containers locked to a stationary base at the container site at first in order to keep pranksters from towing them away. This problem, too, has disappeared and the containers are no longer locked down.

Another recommendation to be offered is that an additional packer truck be available if at all possible due to the problems encountered in a breakdown as well as make additional runs to high generation rate areas. Lee County suffered a time loss of two weeks due to one minor breakdown and subsequent delay in parts arrival. This happened on two occasions. This prompted the county into purchasing a second packer truck. Response to the system has been so overwhelming that now a third truck would be useful for standby purposes since both trucks are presently on route all day.

Another recommendation is to avoid trying to pull more than one mobile container for a great distance at moderate speeds. One container can be pulled as fast as desired; however, the addition of more containers to form a train causes a whiplash effect on the rear trailer which will not stop unless the speed is reduced to below 20 mph. This train-type fashion of towing containers would be ideal for door to door city pickup where slow speeds are common, but is impractical in the rural pickup system for which it was designed. It is possible that a rural mailbox-type pickup schedule such as in the smaller municipalities would be practical over the mobile containers. It would be a good point to study at any rate. For example, a county similar to Lee County in northwestern Alabama has initiated a program such as this which appears to be working quite well. They serve the rural areas with two small packer trucks offering roadside pick-up twice weekly for a flat rate of $2.50 per month per customer.

It has been found also that a solid waste system such as Lee County has cannot be properly operated on a 5-day per week basis. Therefore, an additional pickup of some highly utilized containers has been initiated on Saturdays. This helps to alleviate some of the overfilling problems at these containers. In conjunction with this, it is recommended to regulate the landfill hours to include more operating hours especially in warm weather when people are more likely to clean up. To effect these changes and still keep the employees on a 40-hour week, then a rotational system that allows employees to be off during the week after a Saturday on the job must be utilized.

Several tons each Saturday are brought into the landfill with the packer truck alone operating in high generation rate areas. If left until Monday, these sites would be overflowing with deposited refuse, causing complaints from nearby residents. Another solution would be additional containers placed at these sites to provide ample storage volume of waste until pickup time.

In conjunction with the above, it is highly recommended to initially keep productivity records of each container to determine the sites in greatest need of additional pickup service.

To eliminate coordination problems, it is imperative that each element of the collection unit be provided with radio communication units. This prevents lost time during the collection process as well as give the project director ready communication with each unit of the collection force to handle any emergency that might arise.

During the course of emptying a container, the packer truck lifts the full container up and over the cab of the truck. This gives any liquids or small dust-like particles trapped in the container the opportunity to fall down upon the cab of the truck. Some of this material will inevitably fall directly into the window of the packer truck greatly annoying the driver. Therefore, it is recommended that air-conditioned cabs be installed in the packer truck units to prevent this unsanitary and unpleasant event from taking place.

Also carbon black dust brought to the landfill in emptied sacks by a local tire manufacturer was so bad that the landfill tractor was carried to the manufacturer for the installation of an air-conditioned cab. (Another tractor was loaned to the county by the manufacturer for use during this period. This tractor was a smaller front end loader equipped tractor and proved to be very inferior to the large dozer type tractor employed by the landfill personnel.) This air-conditioned cab will also be a very welcome addition to the operation during the hot summer months.

It is further recommended that in order to make the project a success, it is imperative that all roadside dumps be rehabilitated. After rehabilitation, it will be necessary to enforce anti-litter laws to the maximum if the project is to remain effective. It is of no value to clean a dump and then let people start it all over again; and this will inevitably happen if anti-litter laws are not strictly enforced. As an example Lee County has had several convictions of littering offences since rehabilitation of the roadside dumps. The threat of legal prosecution is the greatest deterrent to willful littering available and must be used if rehabilitated areas and clean roadsides are to remain so.

It should be noted that in comparison of containers used, the stationary containers which load from side mounted doors seem to be less desirable than the top loading models. This was due to the inability to practically fill this container to its maximum capacity. One can see that when the container is almost full, it is difficult to open the side door and place more refuse inside. This is mostly possible by using the top door, but it is very heavy. Also the doors were sometimes left ajar, and if not noticed by the packer truck operator and closed, they would be damaged upon emptying.

With the experience gained thus far in county-wide waste handling, it is felt that the present Lee County system is the most feasible and practical method of collection and disposal for the mass of solid wastes accumulating daily. This method is recommended for any county size unit comparable to Lee County in area and population. It is evident that counties very large in area or very small might find alternate methods or modifications of the Lee County system to more efficiently satisfy their solid waste problems. This can be financed in various ways, such as use charges, increased taxes or revenue sharing funds. Lee County plans to primarily use revenue sharing funds as a source of financing for the solid waste project. There is already in existence a one mil tax levied for this purpose.

SYSTEM DESIGN

Collection and Disposal Methods

To successfully design a properly oriented solid waste handling system for a unit the size of a county requires much study. Such things as container type, size, and location; collection schedules; generation rates; disposal sites; etc. become important design parameters.

The foremost unit to be considered in a system such as this is the collection container. Before any solid waste can be disposed of, it must first be collected in some type of container. This container should be of adequate size to facilitate large objects as well as provide ample storage volume for periods between collection.

As previously mentioned, containers chosen for primary roads in the county, upon which the packer truck can safely travel, were of six cubic yard capacity. These were located on prepared sites along the highways at locations which afforded convenient waste disposal service to nearby residents or passing motorists. They were also located so as to provide easy access by the packer truck for emptying. These containers were equipped with easily opened side mounted doors for convenient waste disposal by everyone (See Figure Four).

These stationary containers were useful and convenient, but by no means were they unique. The containers chosen for rural collection, however, were quite unique in design. As previously mentioned these containers were afforded mobility by the installation of wheels and axles. Their design was further refined by installation of front and rear loading platforms (steps to facilitate access to doors), rear lights and reflectors, front and rear top loading doors, electric brakes, trailer hitch accessories to enable tandem or train hookups, and proper markings to enable ready identification (See Figure Five). These mobile containers were of five cubic yard capacity (largest practical size available). They, too, were located on easily accessible sites to both users and pickup tow trucks (See Figure Six). These sites were equipped with a locking-hook device set in concrete to immobilize these containers, thereby discouraging pranksters bent on moving them. A fold-up leg on the mobile container was installed to provide a level attitude of the container as well as accommodate the locking-hook mounted on the concrete base (See Figure Seven). To facilitate hook-up to the tow truck, a sliding connection was constructed on the hitch assembly giving approximately 18 inches of free travel (See Figure Seven). This was very useful in connecting to a loaded mobile container which weighs approximately 700 to 1000 pounds when fully loaded with typical solid wastes.

With all of the aforementioned additions and refinements to the container system, a very practical and workable program of solid waste storage and collection was developed.

Of equal importance in a worthwhile solid waste system was the disposal method used. Design parameters to consider here were available sites as well as cost of such sites. The sanitary landfill method of disposal was chosen due to its practicality along with the desirable ecological results it produces, i.e., no objectionable odors, flies, rodents, smoke, and unsanitary conditions if properly managed. The sanitary landfill is a method of disposing of refuse on land without creating nuisances or hazards to public health or safety, by utilizing the principles of engineering to confine the refuse to the smallest practical volume, and to cover it with a layer of soil at the conclusion of each day's operation, or at much more frequent intervals as may be necessary. These wastes include all useless, unused, unwanted, or discarded solid or semi-solid materials, including garbage, rubbish, ashes, and all other putrescible and non-putrescible materials except sewage. One can readily see the desirable results obtained by the sanitary landfill method of disposal as compared to the open dump.

Figure 18 shows a typical sanitary landfill operation where final plans are to bring the entire area to the highest original ground elevation, filling the depression with daily amounts of solid wastes and covering with soil creating a cell of compacted wastes. It should be kept in mind that this is only one application of a sanitary landfill, and each particular site will have its peculiar variation of fill procedure required, thus emphasizing the need for competent engineering application for efficient operation. As recommended by the preliminary study on solid waste problems and disposal procedure, the use of but one sanitary landfill area was initiated. Extreme marginal collection of county wastes requires long hauls, but the expenses are generally not as great as the multi-landfill system would be. The primary objection to multiple landfills is the duplication of equipment for operation and personnel. It is evident that there is a limit as to the area to be served by one landfill due to the long haul distances that would be required to dispose of wastes in a very large service area. For a unit the size of a city or a moderately sized county as is the case with Lee County, the single sanitary landfill is felt to be the most practical and economical method to use as opposed to multiple landfills. This, of course, will be dependent upon the size and population of the area to be served.

System Facilities

The single sanitary landfill site chosen for Lee County was 52.6 acres of hilly, wooded land located in the southeastern part of the county near Tupelo (See Figure Eight). This site was rich in well drained granular material needed for covering the compacted refuse. This site was fortunate to be served with a relatively stable paved roadway. Another feature was the existence of a sound block building which could be used for a maintenance building for the containers (mobile and stationary) and trucks, as well as shelter from wind, rain, and cold weather. Since sanitary landfills were relatively new for Mississippi, the State had no formal guidelines for landfill design and site requirements. No permits were required, but a visual inspection of the site was conducted by the Mississippi State Board of Health. Since this more stringent rules have been established by the State governing landfill design and implementation due to the increasing number of landfills in the state.

In addition to the existing facilities, construction of an office and operations building for the scale operator was undertaken (See Figure Nine). This office also housed the large scales necessary to weigh the mass of wastes from each source brought to the landfill daily for disposal. This scalehouse would also serve as shelter and sanitary facilities for project personnel.

For security, a chain-link fence was installed around the perimeter of the scalehouse lot. Inside this fence was also included the tower for radio communications, fuel pumps, and tanks. The scalehouse contained the base unit for the short-wave radio sets mounted in each pickup and packer trucks, affording radio communications between units of the project personnel for better coordination of the collection and disposal systems.

Project Personnel

To properly operate a solid waste project, personnel were selected and trained to fulfill each task well and in accordance with standard and special operational procedures. Consideration in this case proved initially a minimum of six people were required to fully carry out the required operation. These included a scale operator, landfill tractor operator, mechanic and assistant equipment operator, packer truck driver, and two tow truck drivers. This number has now grown to a total of 23 personnel employed by the county's Solid Waste Department with the addition of the other packer trucks and equipment. This gives an idea of the scale of operations that a solid waste project encompasses. It should be noted that 10 of these personnel are used in the municipal pickup system leaving 13 to operate the county system. These thirteen include the original six people plus two additional landfill tractor operators, a spotter or dumping operations director, an additional packer truck driver and assistant driver, plus two maintenance men for various maintenance and cleanup problems.

The ten men needed to carry our the municipal collection include the three packer truck drivers, six loaders, and one spare helper.

Extra project assistance was provided by certain other organizations, all of whom are directly supervised by the County Engineer. Secretarial and clerical assistance is also provided by the County Sanitarian and other members of the Health Department as to sanitary design and possible solution of sanitation related problems.

SYSTEM IMPLEMENTATION

Equipment

Successful implementation of any program calls for proper selection of related equipment. For Lee County to begin a solid waste disposal project as designed, a crawler tractor, scraper, stationary and mobile containers, packer truck and body, scales, and pickup tow trucks had to be selected.

For spreading and compacting refuse at the landfill site, Allis-Chalmers HD11 crawler tractor with a pull-type scraper was purchased.* This tractor can also be used for site clearing, covering filled areas, and access road maintenance. It is equipped with a hydraulically-operated blade and has an enclosed operator's cab. The total weight of the tractor is approximately 31,000 pounds with 20 inch treads which gives ample unit pressures to compact typical solid wastes (See Figure 10).

For weighing the collected refuse brought to the landfill site, a scalehouse was built and a set of 60,000 pound capacity scales was purchased. With a typical weight of approximately 45,000 pounds recorded for the loaded packer truck, these scales are adequate for any weighing done at the landfill.

The rural collection system required waste containers, mobile and stationary, along with a packer body and truck to empty them. The selected containers were of six and five cubic yard capacity for the stationary and mobile units respectively. Containers of larger capacity would present difficulties when trying to place waste into them. The mobile containers were of the top loading design with four smaller and lighter doors cut into the larger metal cover. The stationary containers have easy-open side doors for waste loading. The stationary containers were supplied by E-Z Pack Corporation while the mobile containers were built by a local Tupelo firm, Central Electric Machinery Company. The local construction of the mobile containers proved to be a big advantage; since the engineers in charge of project design could keep a close check on the progress and quality control, as well as make any needed modification of the prototype before the entire lot was completed. Since the original container purchase, several other types have been purchased and used in the county collection system. All types have proven relatively satisfactory, with minor variations preferred by some over others. At present there are 70 mobile containers and 97 stationary containers belonging to the county system. In addition, there are private containers at schools, factories, municipalities, and other organizations for a total of approximately 280 solid waste containers served by the county collection forces.

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* Mention of commercial products does not imply endorsement by the United States Government.

Selection of a packer body required consideration of several parameters. The body chosen had to be of sufficient capacity so as to eliminate frequent and unnecessary trips to the landfill to empty. It also had to be of such a weight that highway load limits were not exceeded for the primary routes.

With these factors in mind, a 30 cubic yard capacity packer body was chosen. This body was equipped with front end loading capacity of 6000 pounds, more than enough to handle the selected containers. This unit can lift a container without tipping before it reaches the door in the top of the body through which the wastes are received. This body was manufactured by E-Z Pack Corporation.

Chosen as a truck upon which the packer body is mounted was a Ford diesel powered, cab-over-engine model with an automatic transmission. This truck was one of various models recommended by the packer body supplier for use with the selected packer unit (See Figure 11).

Three half-ton Chevrolet pickup trucks were purchased for use as tow trucks for the mobile containers. Two of these trucks were designed for use as collection vehicles and the third for maintenance and standby service. These trucks were equipped with movable trailer hitches so as to facilitate container connection. They also have plug-in connectors to operate the electric brakes and brake lights on the mobile containers.

To allow communication between personnel and various collection units, short-wave radio sets were installed in each truck with a base station at the scalehouse. This gives the various collection parties greater coordination capacity.

Training Programs

Prime requirements for program success are user and operator education, both of which share equal importance. To familiarize the personnel of Lee County's solid waste project with proper waste handling procedures, several trips were made to similar operations around the South (Meridian, Miss., Cleveland, Miss., Chilton Co., Ala.) to study problems encountered there and devise possible solutions to problems Lee County might encounter. The personnel involved needed no extensive training because each had prior experience in his respective field of equipment operation. For example, the landfill tractor operator had worked for years as an operator of crawler tractors similar to the one selected for Lee County. He only had to be trained in landfill operation.

Secondly, the mechanic and assistant equipment operator had extensive experience as a diesel and small engine mechanic; therefore, he required little training in his particular job.

The other men chosen to operate the packer truck and tow trucks had experience as truck operators and only needed a familiarization period with each particular piece of equipment in order to function in his job. Each gained more knowledge of proper collection and disposal procedures as time progressed and the project began to get into full operation.

Once the project personnel were educated as to proper collection and disposal procedures, there followed a program of user education to complement success of the project. Extensive coverage by local newspapers as well as a Memphis newspaper gave the solid wastes project a public airing. In addition to this, numerous visits were made by the scale operator and the staff of the County Engineer to various civic organizations to explain the goals and operations of the project. At these meetings slides were shown which had been made of the existing conditions in Lee County and the steps taken to correct them. To aid in these presentations, a copy of the film "The Green Box" was purchased. This is a review of Chilton County, Alabama's solid waste project which is similar to Lee County's project. This helped to stimulate interest in Lee County's endeavors to clean up the numerous open dumps and initiate a modern satisfactory method of solid waste disposal.

Initial Studies

Before the sanitary landfill could be put into full operation, some studies had to be made in order to insure proper initiation. For determination of fill capacity, a topographic survey was done of the entire landfill site. With the aid of this survey, a quick determination of fill depths and areas to be filled could be made. This also provided a basis for planning the fill sequence for the landfill site.

In conjunction with the site investigation, a subsurface soil investigation was conducted by the County Engineer in order to determine the quantity and quality of suitable cover material at the site. Appendix A is a report of the borings and soils analysis done for the Lee County Sanitary landfill site. The investigation consisted of four subsurface borings made with a continuous flight power auger with representative samples taken at each change in soil conditions for laboratory testing.

Soils at the site consisted of predominately tan to red sands and clays overlying the blue Selma Chalk formation as shown by the boring logs. These soils are well drained, granular soils and are very suitable for landfill cover operations as shown by the mechanical analysis reports in Appendix A.

To determine the public knowledge of the project, as well as present disposal practices and related items, questionnaires were mailed to 1,000 randomly selected county residents for their comments (See Figure 13). These questionnaires asked for comments in regard to the neighborhood's pride in its appearance, disposal practices and any costs incurred, disposal-related problems or pests, adequacy of any present system, and awareness of pending county collection and disposal program. The results of these studies will be discussed later in this report.

In addition to this questionnaire, a later Attitude and Usage Survey form was mailed out to the same 1000 residents to determine the public satisfaction of the mewly initiated solid waste collection system and whether or not each person surveyed took advantage of it. (See Figure 13A).

Container Sites

The next step in program development was selection of the numerous container sites over the county. This proved to be not so easy a task, as public reaction in many cases showed apprehension toward close proximity to a container. In other words, the citizenry were enthused about the idea, but not about the possibility of a container located next door. This was understandable due to the inevitable fate of previous types of collection methods such as litter barrels or bins; the public thought that a container site would become an unsightly and unsanitary spot. Due to the fact that they were not familiar with a project of this nature, a reaction such as this was expected. This opinion was not shared by all, fortunately, and soon container sites were being constructed as fast as the supervisor of the respective district could manage. These sites were chosen for several reasons. The most logical location was at densely populated areas preferably near main road intersections. This gave people from several directions easy access to the containers. Another consideration which proved fruitful was to locate a container near a rural store or business area. It proved convenient for workers and housewives on their way to the store to carry along their collected solid wastes for deposit in a container.

Another consideration in the location of containers in very rural situations is to place them near an existing dumping area preferably where the motorist would approach a waste container before reaching his usual unauthorized dumping area.

These sites were mostly clay gravel stabilized unless a paved area was already available. These sites were constructed adjacent to the roadway to allow easy access to the motorist who stops to deposit his wastes in the container, as well as provide ample working space for the collection activities.

As will be discussed later in this report, time proved that public acceptance was growing by rapid measures due to the excellent collection activities and the cleanliness of the container sites. The rural public had encountered a newly found convenience to which they were not accustomed.

SANITARY LANDFILL OPERATIONS

Site Features

The site chosen for the Lee County sanitary landfill consisted of 52.6 acres of wooded hills and some rather deep hollows. These hollows were naturally chosen as the fill area with cover material coming from the hillsides.

Physiographically Lee County is divided by the Tombigbee Hills and the Black Prairie belt of Mississippi. The landfill itself is located in the Tombigbee Hills belt which is the second oldest formation in the State. The surface material is composed mostly of a light gray or reddish, cross-bedded to massive glauconitic sand and sandy clay, slightly calcareous; and, in some areas, containing calcareous sandstone. This is the Coffee Sand Formation which is in some instances a localized aquifer; however, it is not a continuous aquifer due to its upheaval by past diastrophisms leaving it perched in this area above underlying formations. This sand and sand-clay formation is underlain by the Selma Chalk formation which ranges from 15 to 20 feet in depth in most areas and is about 250 to 300 feet thick. These great chalk beds of the Cretaceous Age are of marine origin. As proof, there are thousands of fossils to be found today in this area. Both chemical and detrital sedimentation played a part in the formation of the beds. Formed by the shells of millions of tiny marine organisms that were deposited when the seas receded from the northern part of the State to its present position, these beds present an impervious layer of material to surface waters percolating down from above.

Underlying the great chalk beds are found three formations classified as aquifers from which water is obtained by wells drilled through the overlying chalks. The oldest of these is the Tuscaloosa formation. It contains considerable deposits of sand, clay, and gravel and is one of two sources of natural gravel in the State. The Eutaw formation consists of medium to fine grained sands and clay. The Tombigbee formation is made up of massive, fine, glauconitic sands that are in some places calcareous.

From the aforementioned information, one can see that there is little possibility of extensive primary aquifer contamination from landfills placed over the chalk due to its impervious nature. Any water percolating down from above is trapped by the chalk formation.

For a more detailed look at Lee County's surface soil structure refer to Figure 14.

Site Development

Development of the landfill site began by building a gravel surfaced access road to the primary fill area. This was facilitated by the tractor and the pull-type scraper. A motor grader was borrowed from one of the supervisors for shaping and drainage ditch preparations. Also an existing dilapidated dwelling on the site was torn down and pushed into the fill area.

After choosing a starting point for the fill, the first procedure was to clear trees and stockpile some cover material for use after each day's fill (See Figure 15). This was a relatively simple task since no initial trench had to be cut in order to begin fill operations.

The large existing block building, which was chosen for a shop and maintenance building, was painted and generally reconditioned, including the addition of large sliding doors to allow packer truck access.

A water line from the existing well on the site was laid to the shop building and the scalehouse; however, since this a Farmers Home Administration community water system extension from Plantersville was installed which provides better water service to the project facilities.

To prevent erosion of the soil surrounding the shop building, several loads of gravel were placed around the area by county forces. This aids in mobility during inclement weather.

Also as a deterrent to blowing paper and other loose items, a woven wire fence was placed around the immediate fill area. This prevents the spread of litter over the site when windy conditions exist. The landfill entrance area was landscaped to improve its appearance. The area surrounding the scalehouse inside the the fence was sown with Bermuda grass to prevent erosion and improve appearance. Also signs directing users to the dumping area were installed along the entrance road.

Operations and Procedures

Refuse was placed and compacted in one of the natural valleys located within the site boundary. It is planned to fill these deep valleys with solid wastes, thereby accomplishing two goals; i.e., to dispose of Lee County's solid wastes, and to also possibly rehabilitate some land which in its present state is relatively useless.

As mentioned previously, the increasing refuse is spread and compacted by the landfill tractor and covered daily with a minimum of 6 inches of soil to seal the refuse cell from rainwater and to isolate the fill from rats and flies. If properly done, a sanitary landfill operation is a very neat and clean operation with no visible signs of litter or refuse present after the daily final cover is placed.

Equipment maintenance is of prime importance in any workable program including the use of equipment. The landfill tractor and scraper, the packer trucks, and the pickups have regularly scheduled maintenance according to the manufacturer's specifications supplied with the equipment. This scheduled maintenance should insure a long useful life of the equipment. Special attention should be placed on proper grease levels in all parts of the landfill tractor. This is necessary because of the very coarse and abrasive nature of the sandy soils at the site. These sands are especially rough on the undercarriage and moving parts which come in contact with these soils. This problem is reflected in an almost annual need for overhaul of the tractor's undercarriage assembly.

The stationary and mobile collection containers are serviced when needed. This service includes spot painting, light replacement, brake adjustment, or other needed repairs. The mobile containers can be towed to the maintenance shop for washing or other required repairs. The emptied containers are sprayed with a disinfectant for the control of odors related with the deposited refuse. This disinfectant is manufactured by Del Chemical Co. labeled Triple-X and is useful for sanitation control in sewage related applications or landfills.

As mentioned above, the collection containers are normally emptied twice weekly or more often as needed. This operation usually requires four days of the week, however, an extra pickup on Saturdays is required for some containers where generation rates are highest. This leaves the collection crew one day to perform the required equipment maintenance, site maintenance, or necessary improvements. However, at the present rate of operation, this day of maintenance is virtually eliminated and normal collection procedures are carried out a full six days per week. This means maintenance must be done in the afternoon or at other suitable times rather than a scheduled weekly event.

REHABILITATION OF PREVIOUSLY USED DUMPS

Initially, the dumps rehabilitated were those located on county roadsides and/or private property. Since this, the municipalities have begun to participate in the county solid waste program, and their respective dumping areas have been shut down and cleaned up.

Cleanup of an open dump on a county road was simple enough in that it required either removal of the dumped wastes and transporting to the landfill; or, in case of larger quantities, burial was accomplished with a well-compacted soil cover at the dump site. The municipal dumps were all cleaned by burying the wastes in a section of the site.

To date all of the existing 225 dumps have been cleaned up by the county forces and have not shown any appreciable further use. This removal of any present dumps must be done in order for the program to be a success because unfortunately some people would probably use the most convenient disposal method, and in some cases it may be an existing dump instead of a collection container.

The cleaning of a roadside dump can be accomplished by either of basically three methods. First, in the case of smaller quantities, the refuse can be picked up by hand and/or front-end loader equipment and transported to the landfill. In the case of larger quantities, a trench can be cut and the refuse pushed in and buried near the dump site. In some cases, where terrain is very abrupt causing problems for equipment to operate safely and efficiently and the quantity is too large for hand collection, then the only alternative is to bury the refuse with as much soil as needed to completely cover and dispose of the dumped litter.

This basically covers the rehabilitation program. It should be noted that each dumping area is a problem within itself and no unit costs can reliably be established for rehabilitating a dump. Figure 3 shows the previously used dumping areas in Lee County which have now been rehabilitated. Table 2 gives a list of some of the first cleaned dumping areas in Lee County with the method of rehabilitation. costs incurred, and machine/man hours compiled for each dump. Further discussion of the costs incurred in this rehabilitation program will be listed in section F, other costs, the Economic Assessment section of the report.

It has been noted previously that open dumps were illegal for several reasons. Up until now, however, this law has been ignored due to non-available alternatives. Now that a suitable program has been established and a satisfactory disposal system is available, it is felt that strict legal action should be taken by proper authorities against illegal waste disposal. The threat of conviction for this practice would do much to establish proper disposal techniques for those that find old habits hard to break.

With the closing of these old dumps, then the related problems of flies and rats will be eliminated along with the threat of possible disease that an open dump poses. In addition, the occasional burning that occurs in these dumps will be eliminated.

COLLECTION ACTIVITIES

At present all of the municipalities as well as rural populous are utilizing the county's landfill. In addition to the municipalities, other organizations have purchased waste containers which are presently being served by the collection forces. Each county school has at least one and various manufacturing companies and businesses have containers served by the county's packer truck for a total of approximately 113 containers not owned by the county but served by county collection forces. It is the owner's responsibility, however, for the condition of the containers and surrounding site. There is no charge for serving these private containers by the county collection crews.

Combining the 113 containers mentioned above with the ones owned by the county give a total of approximately 280 solid waste containers serving Lee County. Of these, 70 are mobile type containers and 97 are stationary. Taking the 167 county owned containers and dividing into the present county rural population of about 20,000 gives approximately 120 persons served by each rural refuse container. Multiplying this number by an average of 2.5 pounds per person per day gives 300 pounds per day of solid wastes for each container. Multiplying an average capacity of 5.5 cubic yards (mobile 5 & Stationary 6) by an average waste density of 150 pounds per cubic yard gives 825 total pounds capacity per container. Dividing this by 300 pounds per day gives an average life of 2.8 days before the container needs emptying. This is computed assuming that only rural wastes are placed in the containers at rural generation rates. Of course, this is not true in every case as many types of waste generators use the rural containers also.

The use of stationary container units spread over the county is not unique as previously mentioned. The solution to Lee County's rural collection problem; however, is in itself quite different from any used in the past. Containers mounted on wheels allow mobility over already failing roads and bridges in areas where the 30 cubic yard packer truck cannot travel. Figure 17 gives the location of each stationary and mobile container in Lee County.

The present arrangement is to empty each container twice weekly. This is done even if the container is not full, even though this would be a rarity. The containers are usually filled to capacity when collected. As expected, some sites receive more waste than others, although results from the Attitude and Usage Survey show extreme overloading not to be a serious problem. It was suggested that several containers needed more pickups per week. For this reason, an additional pickup on Saturday is done to alleviate overfilling on weekends of some containers. This is done primarily for the containers located in and around population centers and areas where generation rates are highest. To remedy the overloading of the containers, another container can be located adjacent to the existing one. In addition cost records are kept of monthly rural refuse collection and landfill operations. These unit costs are compared to study the possible use of a system such as this in other counties. These studies are the heart of any demonstration project since a demonstration grant is awarded only to demonstrate a unique system not previously used.

PUBLIC IMPACT

A great measure of any project's success is its impact upon the public, which in this case is the user. As mentioned before, questionnaires were mailed out prior to system implementation to representative samples of the public to possibly establish public knowledge and opinion of present and proposed disposal practices regarding solid wastes.

Results of this questionnaire survey were inconclusive due to the poor responses; only 20 percent of the mailed forms were returned. Of the people answering the questionnaire, 77 percent said that their neighbors and they took pride in the neighborhood's appearance even though 76 percent said trash and garbage was being dumped or scattered on roadsides near them. Also 57 percent said that trash and wastes were being dumped on private property near them contributing to gatherings of stray dogs, flies, rats, etc.; however, only 30 percent said unusual odors were present in their neighborhood.

Of the persons answering the form, 74 percent stated that they had no type of waste collection service. Sixty-five percent of these people had a place to dispose of their waste within one mile of their home. To reduce wastes to be discarded, 76 percent of the returned forms indicated that wastes were burned in metal barrels or cans before dumping. Of interest also was the fact that nine percent of the people answering were paying $4.00 or more for waste collection per month.

Even though _The Tupelo Daily Journal_ and the _Commercial Appeal_

(Memphis-Mid-South) newspapers gave good coverage to the project, 28 percent of the people in Lee County questioned said they were not aware of the solid waste program. Also the word of a program initiation was spread by the County Engineer's staff in its many presentations to civic and local governmental organizations regarding the solid waste program.

To date numerous groups have visited the landfill operation. These groups include visiting supervisors from other counties, city officials from other areas, scout packs, school groups, and various other interested parties. In addition, a solid waste equipment show was held at the landfill site by a local supplier. Another item of interest which served as a follow-up to the publicity, was a county-wide clean-up program sponsored by the Lee County Council of Governments to help rid the county of needless roadside litter and trash. This drive brought over 100,000 pounds of solid waste to the landfill. It is anticipated for this to be an annual affair.

With a rather extensive user education program undertaken, it was decided to study the effects of the efforts made to clean Lee County's roads of litter and refuse. To do this an Attitude and Usage Survey form was mailed out to the same 1000 residents as before to try to determine the impact that user education programs had had on the public. (See Figure 13A).

The response to this survey was much more satisfactory than to the initial questionnaire; approximately 35% of the mailed forms were returned. Of the people answering the survey, 85% thought that Lee County had a good solid waste system, and the same 85% used the system. The survey showed that 59% lived less than one mile from a container and 89% was less than 2 miles from a solid waste container. Only 1% of the people answering the form lived more than 5 miles from a container. With the addition of more containers since this survey, the maximum distance of anyone from a container is less than two miles. Normally one has to travel less than a mile to find a solid waste container. Also 80% said that the container was close enough to his home.

The survey tended to show that the majority of people go to the "Green Box" for that purpose only rather than in conjunction with a trip that takes them by a container. Fifty-five percent of these people said that the container was usually full to overflowing and needed an extra pickup periodically.

Of the people answering this form, 80% thought that this waste handling system was superior to their former method of handling wastes. In addition 20% of the people answering the form had seen the landfill, and all of them thought it was maintained neatly.

To reinforce the conclusion that Lee County has a desirable solid waste program, 87% of the questioned people said that they would not prefer a different type of solid waste service. Of interest is the fact that of the remaining 13% who would prefer a different type service, only 82% of them said they were willing to pay for it.

To this date 4 other counties in the area have adopted Lee County's system of solid waste disposal. It is hoped that in the future many other counties will see fit to try Lee County's approach to proper solid waste management.

ECONOMIC ASSESSMENT

Project Equipment Costs

Initiation of a project such as this requires the purchase of some expensive equipment. This expense is minimized, however, when the results of the efforts are seen. No cost is too great when the protection of our environment is concerned.

The crawler tractor to be used at the landfill for compaction and cover of waste material was the first equipment purchased. Selected for Lee County was an Allis-Chalmers HD-11 tractor which was purchased for $42,731.48. To be used with this, a Caterpillar pull-type scraper was bought for $2,500.00. The tractor has an estimated life of eight years, and by straight line depreciation, this gives annual and monthly depreciation rates of $5,341.44 and $445.12, respectively. The scraper also was estimated to last eight years with annual and monthly depreciation rates of $312.50 and $26.04. This completed the equipment needed for disposal of wastes brought to the landfill. Recently when the municipalities came into the program, an additional crawler tractor (used price $20,000) was purchased to help operate the landfill. Due to its purchase coming at the end of the project period, depreciation costs were not included for this in any reports on this project or in this report.

The next equipment needed to implement the project was collection-oriented. Most prominent among collection items was the packer truck and body. The packer body was manufactured by E-Z Pack Corporation and was mounted on a 1971 Ford CT-8000 diesel powered, cab-over-engine, automatic transmission equipped truck. This complete packer unit was purchased for $27,167.40. With an eight-year life estimation, annual and monthly depreciation rates of $3,395.93 and $283.00 were computed.

In addition a second truck has been purchased to help relieve the single truck of some of the burden of serving the entire county. This truck was put into service in June, 1972, as is reflected by the increased depreciation costs for this month.

The forty-three six cubic yard stationary containers were purchased for a total of $12,586.10. These were estimated to last 12 years with a monthly depreciation rate of $87.40. The sixty-one five cubic yard mobile containers were supplied for $42,490.00. Their life was estimated at 12 years with a monthly depreciation rate of $295.07. Presently fifty-four additional stationary and nine additional mobile containers have been added to the system.

To tow the mobile containers, three 1971 Chevrolet half-ton pickups were purchased for $2,411.10 each. They were estimated to last four years with a monthly depreciation of $50.23 each. In each vehicle was installed a Motorola T51 BBN mobile radio unit at a cost of $902.00 each. These units were estimated to last 10 years with a monthly depreciation cost of $7.52. The base unit for these radios was a Motorola T 3R TN which sold for $1,240.00, including a 150-foot tower and antenna. The estimated life for this installation was also 10 years, giving a monthly depreciation of $10.33.

In conjunction with the aforementioned items of equipment, a 20 foot by 20 foot brick scalehouse was constructed for $10,876.00 (See Figure Nine). Monthly depreciation rates for this were computed to be $36.50 for a twenty-five year life. This modern, air-conditioned facility was furnished with desks, chairs, calculating machines, drafting table, and storage files at a cost of $1,262.00 with a monthly depreciation of $5.26. Installed in the scalehouse, but not in the original price was a set of 30-ton capacity Fairbanks-Morse scales to weigh incoming wastes. These scales were purchased for $8,326.00. They were estimated to last 25 years with a monthly depreciation of $27.75. For accounting purposes, this cost was reflected in collection phase to properly disperse grant funds.

Construction Costs

Costs incurred by construction activities at the initial container sites was approximately $6,000.00 for grading, gravel surfacing, and concrete anchor construction. These sites were estimated to last eight years with a $62.50 monthly depreciation. No cost records were kept for the additional sites, and, therefore, the depreciation cost records later in this report reflect only the depreciation costs for the initial 104 container sites.

Costs at the landfill were $3,000.00 for 0.5 miles of gravel surfaced access road, $360.00 for 2,000 feet of waterline from well to scalehouse, $300.00 for lights around the scalehouse and shop building, and $2,590.00 for a chain-link fence around the scalehouse area and landfill road entrance.

Personnel Costs

The personnel costs needed initially to operate the landfill consisted of $525.00 per month for the landfill tractor operator and was the only personnel cost wholly related to the landfill. Since this, other personnel have been added to the system for a total of twenty-three full-time employees. A breakdown of these various jobs was listed in Section III-C, page 27 of this report. Various salaries for each job are not mentioned here due to the fact that these will vary with location. However, these twenty-three men represent at present a total monthly personnel cost for collection and disposal of approximately $10,850.00 or $130,200.00 per year. This gives an idea as to the expense burden a solid waste project subjects a county to; it is no inexpensive proposition in any sense of the word.

Operating Costs

Having been in actual operation for twenty-seven full months, a relatively sound report on operating costs can be given. These costs are composed of oil, gas, grease, depreciation, etc. The personnel and maintenance costs were mentioned in detail earlier in the report, but will be included again in this section.

The operating costs for the landfill are reported each month on the Landfill Operating Cost Report Form. This form shows the activity at the landfill and the related costs incurred. Monthly operating statistics for the sanitary landfill operation are shown in Table 4.

With almost three years of operation under the belt, Lee County began to experience some realistic figures for equipment, maintenance and repair. Table 3 shows a recapitulation of maintenance and repair expenses on a monthly basis. It should be noted that a large part of the landfill expense was for undercarriage overhaul of the landfill tractor; however, it seems that this will probably be an annual expense due to the coarse nature of the soil at the site and the abrasive action of working in the dumped refuse.

The total maintenance and repair expense for the landfill was $18,465.25 and for the collection activities $15,047.58 giving a total of $33,512.83. This gives a landfill maintenance cost of $683.90 per month and $557.32 for collection or a total of $1241.22 per month for maintenance and repair on the overall system.

This figure probably is a fairly representative one for the present time. It should be noted that Lee County started their waste collection and disposal system with all new equipment, and it is expected that as the equipment begins to age, their maintenance costs will begin to climb.

An amount for depreciation is shown in each monthly report, Tables 4 and 5. One will note that these figures will change as new or additional equipment is added to the system and a value for depreciation is added to compensate. A recapitulation of the various depreciation costs for disposal and collection, along with reasons for each change follows:

RECAPITULATION OF DEPRECIATION COSTS

DISPOSAL

Period	Depreciation Cost	Reason for Change
6/71-9/71	$613.84	Added road, lights, fence, scalehouse, water line to report
9/71-5/72	651.00	Added air-conditioned cab on dozer and more fences
5/72-9/73	712.44	
	COLLECTION	
6/71-5/72	882.05	Added item not previously reported
5/72-6/72	938.19	Added containers
6/72-8/72	1253.48	Added second packer truck
8/72-9/73	1279.64	Added containers

TABLE 2. REHABILITATION OF RURAL DUMPS STATISTICS

DISTRICT NO. 1

			EQUIPMENT												
Dump No.	Tons of Refuse	Volume of Refuse CuYd	Gradall		Bulldozer		Front End Loader		Dump Truck		LABOR		COVER DIRT @ $1/6 CuYd load	Method of Disposal	Total Cost
			Hrs.	Cost @ $25/Hr.	Hrs.	Cost @ $17.50/Hr.	Hrs.	Cost @ $15/Hr.	Hrs.	Cost @ $6.50/Hr.	Hrs.	Cost @ $2/Hr.			
1-1	200	800			5	$87.50	5	$75.0			25	$50.00		Buried	$ 212.50
1-2	1	4							2	$13.00	20	40.00		Hauled	53.00
1-3	1	4							2	13.00	20	40.00		Hauled	53.00
1-4	1	4							2	13.00	20	40.00		Hauled	53.00
1-5															
1-6															
1-7															
1-8															
1-9															
1-10															
1-11															
1-12															
1-13															
1-14															
1-15															
1-16															
1-17															
1-18															
1-19	1	4							1	6.50	6	12.00		Hauled	18.50
1-20															
1-21															
1-22															
1-23															
1-24															
1-25															
1-26															
1-27															
1-28															
1-29															
1-30	2	8			2	35.00								Buried	35.00

TABLE 2. REHABILITATION OF RURAL DUMPS STATISTICS (CONT'D)

DISTRICT NO. 1

Dump No.	Tons of Refuse	Volume of Refuse CuYd	EQUIPMENT Gradall		Bulldozer		Front End Loader		Dump Truck		LABOR		COVER DIRT @ $1/6 CuYd load	Method of Disposal	Total Cost
			Hrs.	Cost @ $25/Hr.	Hrs.	Cost @ $17.50/Hr.	Hrs.	Cost @ $15/Hr.	Hrs.	Cost @ $6.50/Hr.	Hrs.	Cost @ $2/Hr.			
1-31															
1-32															
1-33	1	4			1	$17.50					2	$4.00		Buried	$ 21.50
1-34	2	8			1	17.50					2	4.00		Buried	21.50
1-35															
1-36															
1-37	1	4			1	17.50					1	2.00		Buried	19.50
1-38	1	4			1	17.50					2	4.00		Buried	21.50
1-39	1	4			1	17.50					2	4.00		Buried	21.50
1-40															
1-41	1	4									6	12.00		Buried	12.00
1-42	1	4			1	17.50									17.50
1-43	1	4			1	17.50					2	4.00		Buried	21.50
1-44															
1-45															
1-46															
1-47															
1-48															
1-49															
1-50															
1-51	2	8			2	35.00					2	4.00		Buried	39.00
1-52	4	16			2	35.00					4	8.00		Buried	43.00
1-53	3	12			2	35.00					2	4.00		Buried	39.00
1-54	2	8			2	35.00					3	6.00		Buried	41.00
1-55	10	40			6	105.00					8	16.00		Buried	121.00
1-56	8	32			5	87.50					5	10.00		Buried	97.50
1-57	2	8			3	52.50					2	4.00		Buried	56.50
1-58	50	200			4	70.00	4	60.00			16	32.00		Buried	162.00
1-59	47	188			4	70.00	4	60.00			16	32.00		Buried	162.00
1-60	1	4			2	35.00					2	4.00		Buried	39.00

TABLE 2. REHABILITATION OF RURAL DUMPS STATISTICS (CONT'D)

DISTRICT NO. 1

Dump No.	Tons of Refuse	Volume of Refuse CuYd	EQUIPMENT Gradall Hrs.	Gradall Cost @ $25/Hr.	Bulldozer Hrs.	Bulldozer Cost @ $17.50/Hr.	Front End Loader Hrs.	Front End Loader Cost @ $15/Hr	Dump Truck Hrs.	Dump Truck Cost @ $6.50/Hr.	LABOR Hrs.	LABOR Cost @ $2/Hr.	COVER DIRT @ $1/6 CuYd load	Method of Disposal	Total Cost
1-61	1	4			1	$ 17.50					1	$ 2.00		Buried	$19.50
1-62	1	4			1	17.50					2	4.00		Buried	21.50
1-63	2	8			2	35.00					2	4.00		Buried	39.00
1-64	1	4			1	17.50					1	2.00		Buried	19.50
1-65															
1-66															
1-67															
1-68	20	80			4	70.00					8	16.00		Buried	86.00
1-69	1	4			1	17.50					1	2.00		Buried	19.50
1-70															
1-71	5	20			4	70.00					6	12.00		Buried	82.00
1-72	1	4			2	35.00					2	4.00		Buried	39.00
1-73	20	80			16	280.00					24	48.00		Buried	328.00
1-74	10	40			4	70.00					12	24.00		Buried	94.00
1-75	15	60			6	105.00					8	16.00		Buried	121.00
	421	1684													$ 2,250.50

TABLE 2. REHABILITATION OF RURAL DUMPS STATISTICS

DISTRICT NO. 2

			EQUIPMENT								LABOR				
Dump No.	Tons of Refuse	Volume of Refuse CuYd	Gradall		Bulldozer		Front End Loader		Dump Truck				COVER DIRT @ $1/6 CuYd load	Method of Disposal	Total Cost
			Hrs.	Cost @ $25/Hr.	Hrs.	Cost @ $17.50/Hr.	Hrs.	Cost @ $15/Hr.	Hrs.	Cost @ $6.50/Hr.	Hrs.	Cost @ $2/Hr.			
2-1	2	8					2	30.00	10	65.00				Buried	95.00
2-2	2	8					2	30.00	10	65.00				Buried	95.00
2-3	2	8					2	30.00	10	65.00				Buried	95.00
2-4	2	8					2	30.00	10	65.00				Buried	95.00
2-5	100	400					20	300.00	10	65.00				Buried	365.00
2-6	300	1200					30	450.00	15	97.50				Buried	547.50
2-7	3	12					3	45.00	15	97.50				Buried	142.50
2-8	2	8					2	30.00						Buried	30.00
2-9	2	8					2	30.00						Buried	30.00
2-10	2	8					2	30.00	1	6.50			1	Buried	37.50
2-11	2	8					2	30.00						Buried	30.00
2-12	100	400	16	400.00					80	520.00				Buried	920.00
2-13	3	12					3	45.00						Buried	45.00
2-14	2	8					2	30.00	10	65.00				Hauled	95.00
2-15	1	4					2	30.00						Buried	30.00
2-16	1	4					2	30.00						Buried	30.00
2-17	1	4							3	19.50			1	Buried	20.50
2-18	20	80	4	100.00										Buried	100.00
2-19	10	40	4	100.00					20	130.00				Buried	230.00
2-20	1	4					2	30.00						Buried	30.00
2-21	1	4					2	30.00						Buried	30.00
2-22	2	8					2	30.00						Buried	30.00
2-23	2	8					2	30.00						Buried	30.00
2-24	10	40					2	30.00						Buried	30.00
2-25	2	8					2	30.00						Buried	30.00
2-26	1	4					2	30.00						Hauled	30.00
2-27	2	8					3	45.00						Hauled	45.00
2-28	2	8					2	30.00						Buried	30.00
2-29	1	4					1	15.00						Buried	15.00
2-30	1	4					2	30.00						Buried	30.00

TABLE 2. REHABILITATION OF RURAL DUMPS STATISTICS (CONT'D)

DISTRICT NO. 2

			EQUIPMENT												
Dump No.	Tons of Refuse	Volume of Refuse CuYd	Gradall		Bulldozer		Front End Loader		Dump Truck		LABOR		COVER DIRT @ $1/6 CuYd load	Method of Disposal	Total Cost
			Hrs.	Cost @ $25/Hr.	Hrs.	Cost @ $17.50/Hr.	Hrs.	Cost @ $15/Hr.	Hrs.	Cost @ $6.50/Hr.	Hrs.	Cost @ $2/Hr.			
2-31	12	48					8	120.00					4	Covered	124.00
2-32	8	32					5	75.00						Buried	75.00
2-33	4	16					6	90.00						Buried	90.00
2-34	3	12					6	90.00						Buried	90.00
2-35	1	4			2	35.00								Buried	35.00
	612	2448													
													TOTAL		$3,777.00

TABLE 2. REHABILITATION OF RURAL DUMPS STATISTICS

DISTRICT NO. 3

Dump No.	Tons of Refuse	Volume of Refuse CuYd	EQUIPMENT Gradall Hrs.	Gradall Cost @ $25/Hr.	Bulldozer Hrs.	Bulldozer Cost @ $17.50/Hr.	Front End Loader Hrs.	Front End Loader Cost @ $15/Hr.	Dump Truck Hrs.	Dump Truck Cost @ $6.50/Hr.	LABOR Hrs.	LABOR Cost @ $2/Hr.	COVER DIRT @ $1/6 CuYd load	Method of Disposal	Total Cost
3-1	1	4							1	6.50	3	6.00		Hauled	12.00
3-2	6	24			2	35.00								Buried	35.00
3-3	10	40			1	17.50								Buried	17.50
3-4	150	600			10	175.00								Buried	175.00
3-5	200	800			12	210.00								Buried	210.00
3-6	10	40					4	60.00					15	Covered	75.00
3-7															
3-8-															
3-9															
3-10															
3-11															
3-12															
3-13															
3-14															
3-15															
3-16															
3-17															
3-18	2	8	4	100.00							8	16.00	2	Buried	118.00
3-19	4	16	1	25.00							2	4.00		Buried	29.00
3-20	2	8	1	25.00							2	4.00		Buried	29.00
3-21	110	440	7	175.00					21	136.50	14	28.00		Covered	339.50
3-22															
3-23															
3-24	160	640	16	400.00			16	240.00			96	192.00		Hauled	832.00
3-25															
3-26															
3-27															
3-28															
3-29															
3-30															

TABLE 2. REHABILITATION OF RURAL DUMPS STATISTICS (CONT'D)

DISTRICT NO. 3

Dump No.	Tons of Refuse	Volume of Refuse CuYd	EQUIPMENT Gradall		Bulldozer		Front End Loader		Dump Truck		LABOR		COVER DIRT @ $1/6 CuYd load	Method of Disposal	Total Cost
			Hrs.	Cost @ $25/Hr.	Hrs.	Cost @ $17.50/Hr.	Hrs.	Cost @ $15/Hr.	Hrs.	Cost @ $6.50/Hr.	Hrs.	Cost @ $2/Hr.			
3-31															
3-32															
3-33															
3-34															
3-35	4	16					1	15.00			2	4.00		Buried	19.00
3-36	50	200					3	45.00			6	12.00		Buried	57.00
3-37	30	120					2	30.00			4	8.00		Buried	38.00
3-38	25	100					2	30.00			4	8.00		Buried	38.00
3-39	5	20					1	15.00			1	4.00		Buried	19.00
3-40															
3-41															
3-42															
3-43															
3-44															
3-45															
3-46															
3-47															
3-48	10	40			4	70.00								Buried	70.00
	779	3116													
														TOTAL	2,113.50

TABLE 2. REHABILITATION OF RURAL DUMPS STATISTICS

DISTRICT NO. 4

Dump No.	Tons of Refuse	Volume of Refuse CuYd	EQUIPMENT Gradall Hrs.	Gradall Cost @ $25/Hr.	Bulldozer Hrs.	Bulldozer Cost @ $17.50/Hr.	Front End Loader Hrs.	Front End Loader Cost @ $15/Hr.	Dump Truck Hrs.	Dump Truck Cost @ $6.50/Hr.	LABOR Hrs.	LABOR Cost @ $2/Hr.	COVER DIRT @ $1/6 CuYd load	Method of Disposal	Total Cost
4-1															
4-2															
4-3															
4-4															
4-5	40	160			4	70.00								Buried	70.00
4-6															
4-7	2	8			2	35.00								Buried	35.00
4-8															
4-9	2	8			2	35.00								Buried	35.00
4-10	80	320			16	280.00								Buried	280.00
4-11															
4-12															
4-13															
4-14															
4-15	2	8			2	35.00								Buried	35.00
4-16	100	400			24	420.00								Buried	420.00
4-17	1	4			2	35.00			2	13.00				Buried	48.00
4-18															
4-19															
	227	908													
4-20															
4-21															
4-22															
4-23															
4-24															
4-25															
4-26															
4-27															
4-28															
4-29															
4-30															
4-31															
4-32															
4-33															
															923.00

TABLE 2. REHABILITATION OF RURAL DUMPS STATISTICS

DISTRICT NO. 5

			EQUIPMENT								LABOR		COVER DIRT @ $1/6 CuYd load		
Dump No.	Tons of Refuse	Volume of Refuse CuYd	Gradall		Bulldozer		Front End Loader		Dump Truck					Method of Disposal	Total Cost
			Hrs.	Cost @ $25/Hr.	Hrs.	Cost @ $17.50/Hr.	Hrs.	Cost @ $15/Hr.	Hrs.	Cost @ $6.50/Hr.	Hrs.	Cost @ $2/Hr.			
5-1	1-1/2	5	1	25.00					2	13.00	1	2.00		Hauled	40.00
5-2	20	80	3	75.00					3	19.50	3	6.00		Buried	100.50
5-3	15	60	3	75.00							6	12.00		Buried	87.00
5-4	12	48					2	30.00			4	8.00		Buried	38.00
5-5	15	60					3	45.00			6	12.00		Buried	57.00
5-6	30	120					7	105.00			14	28.00		Buried	133.00
5-7	50	200	14	350.00					28	182.00	14	28.00		Hauled	560.00
5-8	60	240					8	120.00			16	32.00		Buried	152.00
5-9	44	176					4	60.00			8	16.00		Buried	76.00
5-10	50	200					4	60.00			8	16.00		Buried	76.00
5-11	10	40					3	45.00			6	12.00		Buried	57.00
5-12	8	32					2	30.00			4	8.00		Buried	38.00
5-13	9	36					2	30.00			4	8.00		Buried	38.00
5-14	12	48					2	30.00			4	8.00		Buried	38.00
5-15	15	60					3	45.00			6	12.00		Buried	57.00
5-16	12	48	2	60.00							4	8.00		Buried	68.00
5-17	40	160	4	100.00					8	52.00	4	8.00		Hauled	160.00
5-18															
5-19															
5-20	1	4							2	13.00	2	4.00		Hauled	17.00
5-21	2	8							3	19.50	3	6.00		Hauled	25.50
5-22	12	48	22	550.00					28	182.00	22	44.00		Hauled	776.00
5-23	15	60	1	25.00					1	6.50				Hauled	31.50
5-24															
5-25	2	8	2	50.00							2	4.00		Buried	54.00
5-26	21	84	8	200.00					16	104.00				Hauled	304.00
5-27															
5-28															
5-29	40	160	6	150.00			4	60.00	6	39.00	4	8.00		Buried	257.00
5-30															

TABLE 2. REHABILITATION OF RURAL DUMPS STATISTICS

DISTRICT NO. 5

Dump No.	Tons of Refuse	Volume of Refuse CuYd	EQUIPMENT Gradall Hrs.	Gradall Cost @ $25/Hr.	Bulldozer Hrs.	Bulldozer Cost @ $17.50/Hr.	Front End Loader Hrs.	Front End Loader Cost @ $15/Hr.	Dump Truck Hrs.	Dump Truck Cost @ $6.50/Hr.	LABOR Hrs.	LABOR Cost @ $2/Hr.	COVER DIRT @ $1/6 CuYd load	Method of Disposal	Total Cost
5-31	22.5	90	15	375.00					30	195.00	23	46.00		Hauled	616.00
5-32	25	100					20	300.00	36	234.00	8	16.00		Hauled	450.00
5-33	37.5	150	8	200.00					24	156.00	8	16.00		Hauled	372.00
5-34	3	12					2	30.00			2	8.00		Buried	38.00
	584.5	2338													
													TOTAL		4,716.50

RECAP OF COSTS

District 1	$ 2,250.50
District 2	3,777.00
District 3	2,113.50
District 4	923.00
District 5	4,716.50
Total	$13,780.50 For 2623 5 Tons = $5.25 Per Ton

Total Dumps Rehabilitated - 122
Total Tons Disposed - 2623.5
Average Tons/Dump - 21.5
Total Dumps Remaining - 103
Probable Tons to be Disposed - 103 x 21.5 = 2214 5
Probable Cost for Remaining Dump Rehabilitation 2214.5 x 5.25 = 11,626.12
Estimated Total for Rural Dump Rehabilitation = 13,780.50 + 11,626.12 = $25,406.62

TABLE 3

RECAPITULATION OF MAINTENANCE EXPENSES

	Landfill	Collection
June 1971	0.00	0.00
July 1971	0.00	0.00
August 1971	0.00	0.00
September 1971	0.00	96.08
October 1971	89.48	237.93
November 1971	6.82	35.34
December 1971	0.00	67.17
January 1972	796.71	168.59
February 1972	174.90	626.12
March 1972	0.00	461.87
April 1972	2,059.14	218.80
May 1972	266.00	122.31
June 1973	120.00	695.22
July 1972	211.99	805.66
August 1972	374.89	716.76
September 1972	594.10	240.70
October 1972	989.84	513.08
November 1972	8.00	203.51
December 1972	859.73	540.97
January 1973	147.62	1,167.04
February 1973	8,259.00	1,386.62
March 1973	726.72	2,169.58
April 1973	394.15	1,740.42
May 1973	1,609.85	893.78
June 1973	240.09	758.00
July 1973	176.02	351.63
August 1973	360.20	830.40
	$18,465.25	$15,047.58

Total Maintenance Expenses - $33,512.83

Landfill costs per month - $18,465.25/27 = $683.90

Collection costs per month - $15,047.58/27 = $557.32

Total costs per month - $1241.22

TABLE 4

MONTHLY OPERATING STATISTICS FOR THE SANITARY LANDFILL OPERATIONS

	For month ending:	6/30/71	7/31/71	8/31/71
		ACTIVITY		
1.	Refuse disposed (tons)	168	315	357
2.	Man-hours employed	352	336	352
3.	Machine-hours employed	132	126	132
		COSTS		
4.	Labor wages (includes fringe benefits)*	$1,157.20	$1,157.20	$1,157.20
5.	Fuels and lubricants	132.10	118.51	157.28
6.	Equipment repairs and maintenance	0.00	0.00	244.88
7.	Utilities	14.11	11.81	12.42
8.	Building repairs and maintenance	0.00	0.00	0.00
9.	Supervisor's salary **	458.33	458.33	458.33
10.	Facility and equipment depreciation***	613.84	613.84	613.84
11.	Other costs	0.00	0.00	0.00
12.	Total operating costs	$2,375.58	$2,359.69	$2,643.95
		EFFICIENCY FACTORS		
13.	Labor efficiency (hours/ton)	2.10	1.07	1.00
14.	Equipment efficiency (hours/ton)	0.78	0.40	0.37
		UNIT COST FACTORS		
15.	Labor costs per ton disposed	$ 6.89	$3.67	$3.24
16.	Operating overhead cost per ton	3.60	1.87	2.45
17.	Depreciation costs per ton	3.65	1.95	1.72
18.	Total operating cost per ton	$14.14	$7.49	$7.41

* includes scale operator and landfill equipment operator

** this amount represents one half of project director's salary; additional one-half is shown under collection expenses

*** includes landfill tractor, scraper, cab and A/C for tractor, land purchase, lights, fences, water line, scalehouse, base radio, and office furniture

TABLE 4 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE SANITARY LANDFILL OPERATIONS

For month ending:	9/30/71	10/31/71	11/30/71	12/31/71
	ACTIVITY			
1. Refuse disposed (tons)	330	351	310	443
2. Man-hours employed	352	336	336	320
3. Machine-hours employed	132	132	126	120
	COSTS			
4. Labor wages	$1,157.20	$1,157.20	$1,157.20	$1,157.20
5. Fuels and lubricants	116.03	115.00	172.09	161.44
6. Equipment repairs and maintenance	0.00	89.48	6.82	0.00
7. Utilities	15.16	35.47	61.95	70.35
8. Building repairs and maintenance	0.00	0.00	8.80	0.00
9. Supervisor's salary	458.33	458.33	458.33	458.33
10. Facility and equipment depreciation	651.00	651.00	651.00	651.00
11. Other costs	0.00	751.87	258.01	215.31
12. Total Costs	$2,397.72	$3,258.37	$2,774.20	$2,713.63
	EFFICIENCY FACTORS			
13. Labor efficiency (hours/ton)	1.06	0.99	1.12	0.72
14. Equipment efficiency (hours/ton)	1.06	0.40	0.41	0.27
	UNIT COST FACTORS			
15. Labor costs per ton disposed	$3.51	$3.29	$3.74	$2.61
16. Operating overhead cost per ton	1.79	4.12	3.12	2.04
17. Depreciation costs per ton	1.97	1.86	2.10	1.47
18. Total operating cost per ton	$7.27	$9.27	$8.96	$6.12

TABLE 4 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE SANITARY LANDFILL OPERATIONS

For month ending:	1/31/72	2/28/72	3/31/72	4/30/72
ACTIVITY				
1. Refuse disposed (tons)	642	434	682	1003
2. Man-hours employed	320	336	368	368
3. Machine-hours employed	120	126	138	140
COSTS				
4. Labor wages	$1,157.20	$1,157.20	$1,157.20	$1,157.20
5. Fuels and lubricants	204.70	95.45	101.20	118.45
6. Equipment repairs and maintenance	796.71	174.90	0.00	2,059.14
7. Utilities	42.00	37.77	42.49	79.76
8. Building repairs and maintenance	0.00	0.00	0.00	0.00
9. Supervisor's salary	458.33	458.33	458.33	458.33
10. Facility and equipment depreciation	651.00	651.00	651.00	651.00
11. Other costs	76.97	61.80	0.00	707.61
12. Total **Costs**	$3,386.91	$2,636.45	$2,410.22	$5,231.49
EFFICIENCY FACTORS				
13. Labor efficiency (hours/ton)	0.49	0.77	0.54	0.36
14. Equipment efficiency (hours/ton)	0.19	0.29	0.20	0.14
UNIT COST FACTORS				
15. Labor costs per ton disposed	$1.80	$2.66	$1.70	$1.15
16. Operating overhead cost per ton	2.46	1.91	0.88	3.41
17. Depreciation costs per ton	1.01	1.50	0.95	0.65
18. Total operating cost per ton	5.27	$6.07	$3.53	$5.21

TABLE 4 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE SANITARY LANDFILL OPERATIONS

For month ending:	5/31/72	6/30/72	7/31/72	8/31/72
	ACTIVITY			
1. Refuse disposed (tons)	770	733	683	1122
2. Man-hours employed	368	416	416	424
3. Machine-hours employed	140	154	162	178
	COSTS			
4. Labor wages	$1,236.10*	$1,236.10	$1,236.10	$1,236.10
5. Fuels and lubricants	231.93	149.27	218.41	116.15
6. Equipment repairs and maintenance	266.00	120.00	211.99	374.89
7. Utilities	37.36	32.48	113.27	68.51
8. Building repairs and maintenance	0.00	0.00	0.00	0.00
9. Supervisor's salary	458.33	458.33	458.33	458.33
10. Facility and equipment depreciation	712.44	712.44	712.44	712.44
11. Other costs	220.34	316.39	587.44	218.04
12. Total Costs	$3,162.50	$2,925.01	$3,537.98	$3,184.46
	EFFICIENCY FACTORS			
13. Labor efficiency (hours/ton)	0.45	0.57	0.61	0.37
14. Equipment efficiency (hours/ton)	0.18	0.21	0.24	0.16
	UNIT COST FACTORS			
15. Labor costs per ton disposed	$1.61	$1.69	$1.81	$1.10
16. Operating overhead cost per ton	1.58	1.33	2.33	1.10
17. Depreciation costs per ton	0.93	0.97	1.04	0.63
18. Total operating cost per ton	$4.12	$3.99	$5.18	$2.83

* increased due to raise in salary

TABLE 4 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE SANITARY LANDFILL OPERATIONS

For month ending:		9/30/72	10/31/72	11/30/72	12/31/72
		ACTIVITY			
1.	Refuse disposed (tons)	1168	1134	1141	1016
2.	Man-hours employed	428	428	420	420
3.	Machine-hours employed	180	183	185	178
		COSTS			
4.	Labor wages	$1,236.10	$1,236.10	$1,236.10	$1,236.10
5.	Fuels and lubricants	193.55	47.40	304.10	218.19
6.	Equipment repairs and maintenance	594.10	989.84	8.00	859.73
7.	Utilities	79.20	80.69	94.04	73.47
8.	Building repairs and maintenance	0.00	0.00	0.00	0.00
9.	Supervisor's salary	458.33	541.66	541.66	541.66
10.	Facility and equipment depreciation				
11.	Other costs	507.55	244.35	223.16	177.50
12.	Total Costs	$3,781.27	$3,862.48	$3,120.50	$3,819.05
		EFFICIENCY FACTORS			
13.	Labor efficiency (hours/ton)	0.37	0.38	0.37	0.41
14.	Equipment efficiency (hours/ton)	0.16	0.16	0.16	0.17
		UNIT COST FACTORS			
15.	Labor costs per ton disposed	$1.06	$1.09	$1.09	$1.22
16.	Operating overhead cost per ton	1.57	1.69	1.03	1.84
17.	Depreciation costs per ton	0.61	0.63	0.62	0.70
18.	Total operating cost per ton	$3.24	$3.40	$2.73	$3.76

TABLE 4 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE SANITARY LANDFILL OPERATIONS

For month ending:	1/31/73	2/28/73	3/31/73	4/30/73
	ACTIVITY			
1. Refuse disposed (tons)	1115	1100	1167	1179
2. Man-hours employed	420	400	428	400
3. Machine-hours employed	184	180	188	180
	COSTS			
4. Labor wages	$1,236.10	$1,236.10	$1,236.10	$1,236.10
5. Fuels and lubricants	118.50	176.01	132.72	188.00
6. Equipment repairs and maintenance	147.62	8,259.00	726.72	394.15
7. Utilities	121.18	112.03	92.95	105.20
8. Building repairs and maintenance	633.02	0.00	0.00	0.00
9. Supervisor's salary	541.66	541.66	541.66	541.66
10. Facility and equipment depreciation	712.44	712.44	712.44	712.44
11. Other costs	337.71	341.52	613.72	394.15
12. Total **Costs**	**$3,843.23**	**$11,378.76**	**$4,056.31**	**$3,571.72**
	EFFICIENCY FACTORS			
13. Labor efficiency (hours/ton)	0.38	0.36	0.37	0.34
14. Equipment efficiency (hours/ton)	0.16	0.16	0.16	0.16
	UNIT COST FACTORS			
15. Labor costs per ton disposed	$1.11	$1.12	$1.06	$1.05
16. Operating overhead cost per ton	1.70	8.57	1.81	1.38
17. Depreciation costs per ton	0.64	0.65	0.61	0.60
18. Total operating cost per ton	$3.45	$10.34	$3.48	$3.03

TABLE 4 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE SANITARY LANDFILL OPERATIONS

	For month ending:	5/31/73	6/30/73	7/31/73	8/31/73
	ACTIVITY				
1.	Refuse disposed (tons)	1307	1330	1403	1237
2.	Man-hours employed	396	410	392	400
3.	Machine-hours employed	188	192	192	190
	COSTS				
4.	Labor wages	$1,236.10	$1,236.10	$1,236.10	$1,236.10
5.	Fuels and lubricants	262.75	280.12	301.48	340.20
6.	Equipment repairs and maintenance	1,609.85	240.09	176.02	360.20
7.	Utilities	89.36	51.68	62.84	61.10
8.	Building repairs and maintenance	0.00	0.00	0.00	0.00
9.	Supervisor's salary	541.66	541.66	541.66	541.66
10.	Facility and equipment depreciation	712.44	712.44	712.44	712.44
11.	Other costs	587.21	361.65	218.93	217.04
12.	Total Cost	$5,039.37	$3,423.74	$3,249.47	$3,468.74
	EFFICIENCY FACTORS				
13.	Labor efficiency (hours/ton)	0.30	0.30	0.28	0.32
14.	Equipment efficiency (hours/ton)	0.14	0.14	0.14	0.15
	UNIT COST FACTORS				
15.	Labor costs per ton disposed	$0.95	$0.93	$0.88	$1.00
16.	Operating overhead cost per ton	2.36	1.11	0.93	1.23
17.	Depreciation costs per ton	0.55	0.54	0.51	0.58
18.	Total operating cost per ton	$3.86	$2.58	$2.32	$2.81

TABLE 4 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE SANITARY LANDFILL OPERATIONS

For month ending:		Average for Period
		ACTIVITY
1.	Refuse disposed (tons)	838
2.	Man-hours employed	383
3.	Machine-hours employed	158
		COSTS
4.	Labor wages	$1,203.96
5.	Fuels and lubricants	176.70
6.	Equipment repairs and maintenance	692.97
7.	Utilities	62.91
8.	Building repairs and maintenance	23.77
9.	Supervisor's salary	492.28
10.	Facility and equipment depreciation	683.28
11.	Other costs	282.90
12.	Total Cost	$3,618.77
		EFFICIENCY FACTORS
13.	Labor efficiency (hours/ton)	0.46
14.	Equipment efficiency (hours/ton)	0.19
		UNIT COST FACTORS
15.	Labor costs per ton disposed	$1.44
16.	Operating overhead cost per ton	2.07
17.	Depreciation costs per ton	.82
18.	Total operating cost per ton	$4.33

Rural collection costs are also reported monthly on a Rural Refuse Collection Summary Form. This form lists activity and related cost, as does the landfill report form. A survey of the twenty seven months reported thus far are shown as follows in Table 5.

TABLE 5

MONTHLY OPERATING STATISTICS FOR THE RURAL COLLECTION OPERATION

Period ending:	6/30/71	7/31/71	8/31/71
ACTIVITY			
1. Refuse quantity collected (tons)	50	136	158
2. Total man hours	382	591	517
3. Total machine hours	174	197	315
Pickup truck hours on route	116	137	212
Packer truck hours on route	58	60	97
4. Total machine miles	3,532.00	7,561.00	6,523.00
Pickup truck miles on route	2,420.00	6,443.00	4,462.00
Packer truck miles on route	1,112.00	1,118.00	1,975.00
5. Labor costs (with fringe benefits)*	$1,700.35	$1,700.35	$1,700.35
6. Fuels and lubricants	90.33	201.12	274.82
7. Repairs and maintenance	0.00	0.00	0.00
8. Supervisor's Salary	458.33	458.33	458.33
9. Depreciation costs **	882.05	882.05	882.05
10. Other Costs	0.00	0.00	0.00
11. Total Costs	3,196.34	3,417.92	3,565.32
EFFICIENCY FACTORS			
11. Labor efficiency (man hours/ton)	7.64	4.41	3.27
12 Equipment efficiency (machine hours/ton)	3.48	1.47	2.00
COST FACTORS			
13. Labor cost per ton collected	$34.01	$ 12.50	$10.76
14. Operating overhead cost per ton	10.97	4.85	4.64
15. Depreciation cost per ton	17.14	6.49	5.58
16. Total cost per ton collected	62.62	123.84	20.98

*includes assistant equipment operator, packer truck driver, two pickup truck drivers

**includes container site preparations, 3 pickup trucks, packer truck, containers, radio (mobile)

TABLE 5 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE RURAL COLLECTION OPERATION

Period ending:	9/30/71	10/31/71	11/30/71	12/31/71
ACTIVITY				
1. Refuse quantity collected (tons)	148	148	175	227
2. Total man hours	494	523	552	533
3. Total machine hours	292	315	344	330
Pickup truck hours on route	195	210	229	227
Packer truck hours on route	91	95	102	90
4. Total machine miles	6,223	6,272	6,481	6,762
Pickup truck miles on route	4,135	4,062	4,315	4,794
Packer truck miles on route	1,937	1,957	1,832	1,697
5. Labor costs	$1,700.35	$1,700.35	$1,700.35	$1,700.35
6. Fuels and lubricants	216.74	209.51	227.26	217.55
7. Repairs and maintenance	96.08	237.93	35.34	67.17
8. Supervisor's salary	458.33	458.33	458.33	458.33
9. Depreciation costs	882.05	882.05	882.05	882.05
10. Other Costs	0.00	74.94	443.28	75.30
11. Total Costs	$3,353.55	$3,563.11	$3,746.61	$3,400.75
EFFICIENCY FACTORS				
11. Labor efficiency (man hours/ton)	3.32	2.86	3.15	2.35
12. Equipment efficiency (machine hours/ton)	1.97	2.13	1.96	1.45
COST FACTORS				
13. Labor cost per ton collected	$11.49	$11.49	$ 9.72	$ 7.49
14. Operating overhead cost per ton	5.21	6.63	6.65	3.61
15. Depreciation cost per ton	5.96	5.96	5.04	3.89
16. Total cost per ton collected	22.66	24.08	21.41	14.99

TABLE 5 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE RURAL COLLECTION OPERATION

Period ending:	1/31/72	2/28/72	3/31/72	4/30/72
ACTIVITY				
1. Refuse quantity collected (tons)	227	205	266	257
2. Total man hours	523	578	607	606
3. Total machine hours	345	424	414	390
Pickup truck hours on route	230	308	278	260
Packer truck hours on route	101	101	113	100
4. Total machine miles	6,747	8,775	11,485	9,320
Pickup truck miles on route	4,413	5,371	5,025	4,820
Packer truck miles on route	1,675	1,258	2,095	1,963
5. Labor costs	$1,700.35	$1,700.35	$1,700.35	$1,700.35
6. Fuels and lubricants	222.74	260.22	392.86	277.48
7. Repairs and maintenance	168.59	626.12	461.87	218.80
8. Supervisor's salary	458.33	458.33	458.33	458.33
9. Depreciation costs	882.05	882.05	882.05	882.05
10. Other Costs	48.45	316.75	158.77	570.07
11. Total Costs	$3,448.45	$4,243.82	$4,054.23	$4,107.08
EFFICIENCY FACTORS				
11. Labor efficiency (man hours/ton)	2.30	2.81	2.28	2.38
12. Equipment efficiency (machine hours/ton)	1.46	2.07	1.55	1.52
COST FACTORS				
13. Labor cost per ton collected	$ 7.49	$ 8.29	$ 6.39	$ 6.62
14. Operating overhead cost per ton	3.96	8.10	5.53	5.93
15. Depreciation cost per ton	3.89	4.30	3.32	3.43
16. Total cost per ton collected	$15.34	$20.69	$15.24	$15.98

TABLE 5 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE RURAL COLLECTION OPERATION

Period ending:	5/31/72	6/30/72	7/31/72	8/31/72
ACTIVITY				
1. Refuse quantity collected (tons)	352	354	404	462
2. Total man hours	584	590	590	610
3. Total machine hours	467	441	412	482
Pickup truck hours on route	289	268	181	218
Packer truck hours on route	145	146	201	237
4. Total machine miles	10,639	9,997	9,887	11,303
Pickup truck miles on route	5,584	4,878	3,457	4,165
Packer truck miles on route	2,743	2,837	4,071	4,664
5. Labor costs	$1,810.06	$1,810.06	$1,810.06	$1,810.06
6. Fuels and lubricants	361.94	341.97	370.20	392.00
7. Repairs and maintenance	122.31	695.22	805.66	716.76
8. Supervisor's salary	458.33	458.33	458.33	458.33
9. Depreciation costs	938.19	1,253.48	1,253.48	1,253.48
10. Other Costs	154.77	299.19	30.17	555.11
11. Total Costs	$3,845.60	$4,825.25	$4,727.90	$5,211.90
EFFICIENCY FACTORS				
11. Labor efficiency (man hours/ton)	1.66	1.66	1.46	1.32
12. Equipment efficiency (machine hours/ton)	1.33	1.25	1.02	1.04
COST FACTORS				
13. Labor cost per ton collected	$5.14	$5.11	$4.48	$3.92
14. Operating overhead cost per ton	3.12	4.98	4.12	4.59
15. Depreciation cost per ton	2.67	3.54	3.10	2.77
16. Total cost per ton collected	10.93	13.63	11.70	11.28

TABLE 5 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE RURAL COLLECTION OPERATION

Period ending:	9/30/72	10/31/72	11/30/72	12/31/72
ACTIVITY				
1. Refuse quantity collected (tons)	454	504	485	568
2. Total man hours	595	595	571	585
3. Total machine hours	468	489	465	499
Pickup truck hours on route	219	219	219	252
Packer truck hours on route	233	254	230	212
4. Total machine miles	11,186	12,080	10,985	12,279
Pickup truck miles on route	4,048	4,345	4,614	4,669
Packer truck miles on route	4,549	4,460	4,229	3,715
5. Labor costs	1,810.06	1,810.06	1,810.06	1,810.06
6. Fuels and lubricants	399.50	442.45	416.57	432.20
7. Repairs and maintenance	240.70	513.08	203.51	540.97
8. Supervisor's salary	458.33	541.66	541.66	541.66
9. Depreciation costs	1,279.64	1,279.64	1,279.64	1,279.64
10. Other Costs	45.13	32.75	6.50	0.00
11. Total Costs	$4,233.36	$4,619.64	$4,257.94	$4,604.53
EFFICIENCY FACTORS				
11. Labor efficiency (man hours/ton)	1.31	1.18	1.16	1.03
12. Equipment efficiency (machine hours/ton)	1.03	0.96	0.96	0.88
COST FACTORS				
13. Labor cost per ton collected	$3.99	$3.59	$3.73	$3.19
14. Operating overhead cost per ton	2.52	3.04	2.41	2.67
15. Depreciation cost per ton	2.82	2.54	2.64	2.25
16. Total cost per ton collected	9.33	9.17	8.78	8.11

TABLE 5 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE RURAL COLLECTION OPERATION

Period ending:	1/31/73	2/28/73	3/31/73	4/30/73
ACTIVITY				
1. Refuse quantity collected (tons)	585	521	491	522
2. Total man hours	675	621	681	896
3. Total machine hours	603	551	677	764
Pickup truck hours on route	362	350	418	432
Packer truck hours on route	210	162	231	426
4. Total machine miles	12,566	12,789	13,188	17,715
Pickup truck miles on route	6,984	6,940	7,072	9,265
Packer truck miles on route	3,490	3,097	4,504	7,024
5. Labor costs	$1,810.06	$1,810.06	$1,810.06	$1,810.06
6. Fuels and lubricants	433.39	394.55	456.69	684.60
7. Repairs and maintenance	1,167.04	1,386.62	2,169.58	1,740.42
8. Supervisor's salary	541.66	541.66	5[illegible]66	541.66
9. Depreciation costs	1,279.64	1,279.64	1,279.64	1,279.64
10. Other Costs	45.65	15.36	99.60	178.11
11. Total Cost	$5,277.44	$5,427.89	$6,357.23	$6,234.49
EFFICIENCY FACTORS				
11. Labor efficiency (man hours/ton)	1.15	1.20	1.39	1.70
12. Equipment efficiency (machine hours/ton)	1.06	1.10	1.38	1.40
COST FACTORS				
13. Labor cost per ton collected	$3.09	$3.47	$3.69	$3.47
14. Operating overhead cost per ton	3.74	4.49	6.65	6.02
15. Depreciation cost per ton	2.19	2.46	2.61	2.45
16. Total cost per ton collected	9.02	10.42	12.95	11.94

TABLE 5 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE RURAL COLLECTION OPERATION

Period ending:	5/31/73	6/30/73	7/31/73	8/31/73
ACTIVITY				
1. Refuse quantity collected (tons)	555	559	601	575
2. Total man hours	725	838	824	852
3. Total machine hours	682	694	792	692
Pickup truck hours on route	335	342	441	342
Packer truck hours on route	335	340	340	339
4. Total machine miles	14,429	14,390	14,616	16,046
Pickup truck miles on route	5,076	5,268	5,214	5,180
Packer truck miles on route	5,617	5,270	5,547	5,230
5. Labor costs	1,810.06	1,810.06	1,810.06	1,810.06
6. Fuels and lubricants	551.40	544.31	567.27	637.93
7. Repairs and maintenance	893.78	758.00	351.63	830.40
8. Supervisor's salary	541.66	541.66	541.66	541.66
9. Depreciation costs	1,279.64	1,279.64	1,279.64	1,279.64
10. Other Costs	34.90	219.94	76.20	14.80
11. Total Costs	$5,111.44	5,153.61	$4,626.46	$5,114.49
EFFICIENCY FACTORS				
11. Labor efficiency (man hours/ton)	1.30	1.52	1.37	1.48
12. Equipment efficiency (machine hours/ton)	1.23	1.24	1.32	1.20
COST FACTORS				
13. Labor cost per ton collected	$3.26	$3.24	$3.01	$3.15
14. Operating overhead cost per ton	3.64	3.69	2.56	3.52
15. Depreciation cost per ton	2.31	2.29	2.13	2.23
16. Total cost per ton collected	9.21	9.22	7.70	8.90

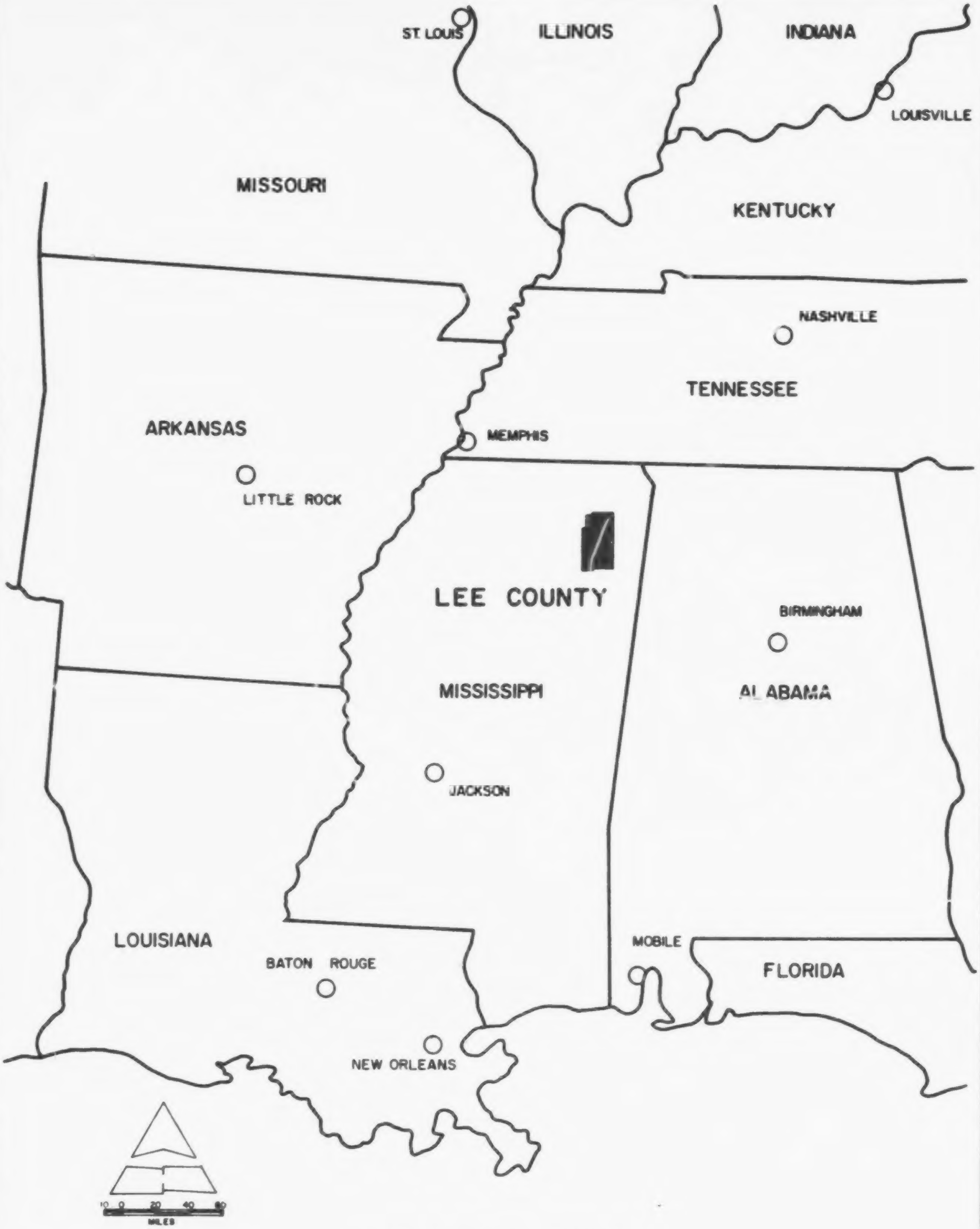
TABLE 5 (Continuation)

MONTHLY OPERATING STATISTICS FOR THE RURAL COLLECTION OPERATION

Period ending:	Average for Period
ACTIVITY	
1. Refuse quantity collected (tons)	370
2. Total man hours	620
3. Total machine hours	471
Pickup truck hours on route	270
Packer truck hours on route	187
4. Total machine miles	10,510
Pickup truck miles on route	5,075
Pickup truck miles on route	3,321
5. Labor Costs	$1,765.36
6. Fuels and lubricants	371.02
7. Repairs and maintenance	557.32
8. Supervisor's salary	492.28
9. Depreciation costs	1,103.07
10. Other Costs	129.47
11. Total Costs	4,418.52
EFFICIENCY FACTORS	
11. Labor efficiency (man hours/ton)	1.68
12. Equipment efficiency (machine hours/ton)	1.27
COST FACTORS	
13. Labor cost per ton collected	$4.77
14. Operating overhead cost per ton	4.19
15. Depreciation cost per ton	2.98
16. Total cost per ton collected	11.94

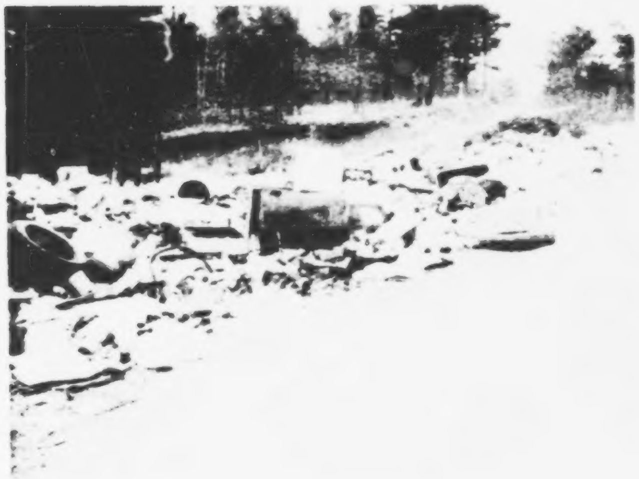
Other Costs

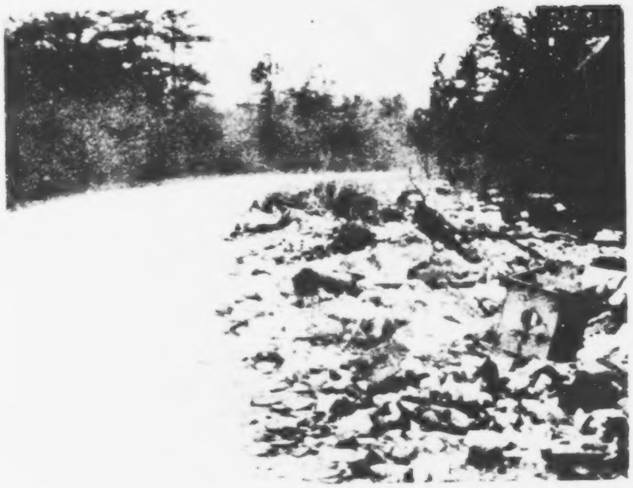
To date, no major associated costs that do not fit into the landfill or collection categories have been incurred with the exception of the costs involved in rehabilitation of the approximately 122 roadside dumping areas throughout the county. A breakdown of these costs as associated with each respective dump is depicted in Table 2. Records were not kept on the remaining dumps, but projected costs were computed and are shown also. It should be noted that this is only an estimate and accurate records of this activity are difficult to compile. Such small items as gloves, rain wear, shovels, and other miscellaneous items have been purchased but have not contributed to a large expenditure for the program. Other services have been performed for the program such as soil borings, laboratory analyses, surveying, and drafting projects. These were done by the personnel of the County Engineer at no extra expense to the project.

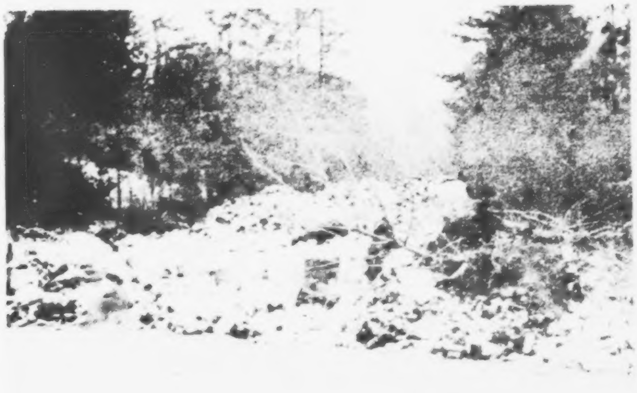

ST. LOUIS
ILLINOIS
INDIANA
LOUISVILLE
MISSOURI
KENTUCKY
NASHVILLE
TENNESSEE
ARKANSAS
MEMPHIS
LITTLE ROCK
LEE COUNTY
BIRMINGHAM
MISSISSIPPI
ALABAMA
JACKSON
LOUISIANA
BATON ROUGE
MOBILE
FLORIDA
NEW ORLEANS
10 0 20 40 60
MILES

LOCATION MAP

FIGURE 1





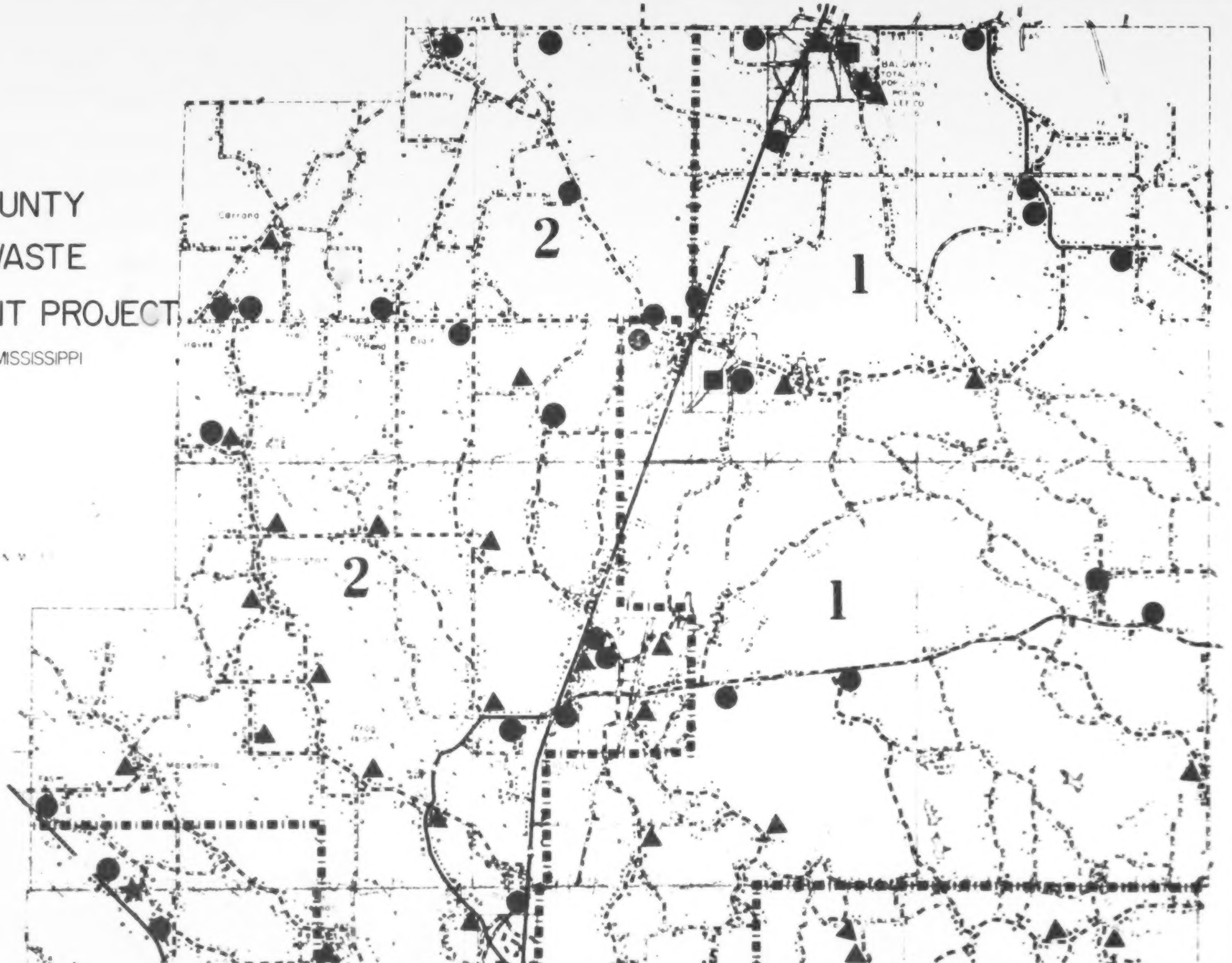


TYPICAL
DISPOSAL SITES

FIGURE 2

LEE COUNTY
SOLID WASTE
MANAGEMENT PROJECT

LEE COUNTY, MISSISSIPPI



2
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1
3
Bethany

FIGURE 3 - p. 1

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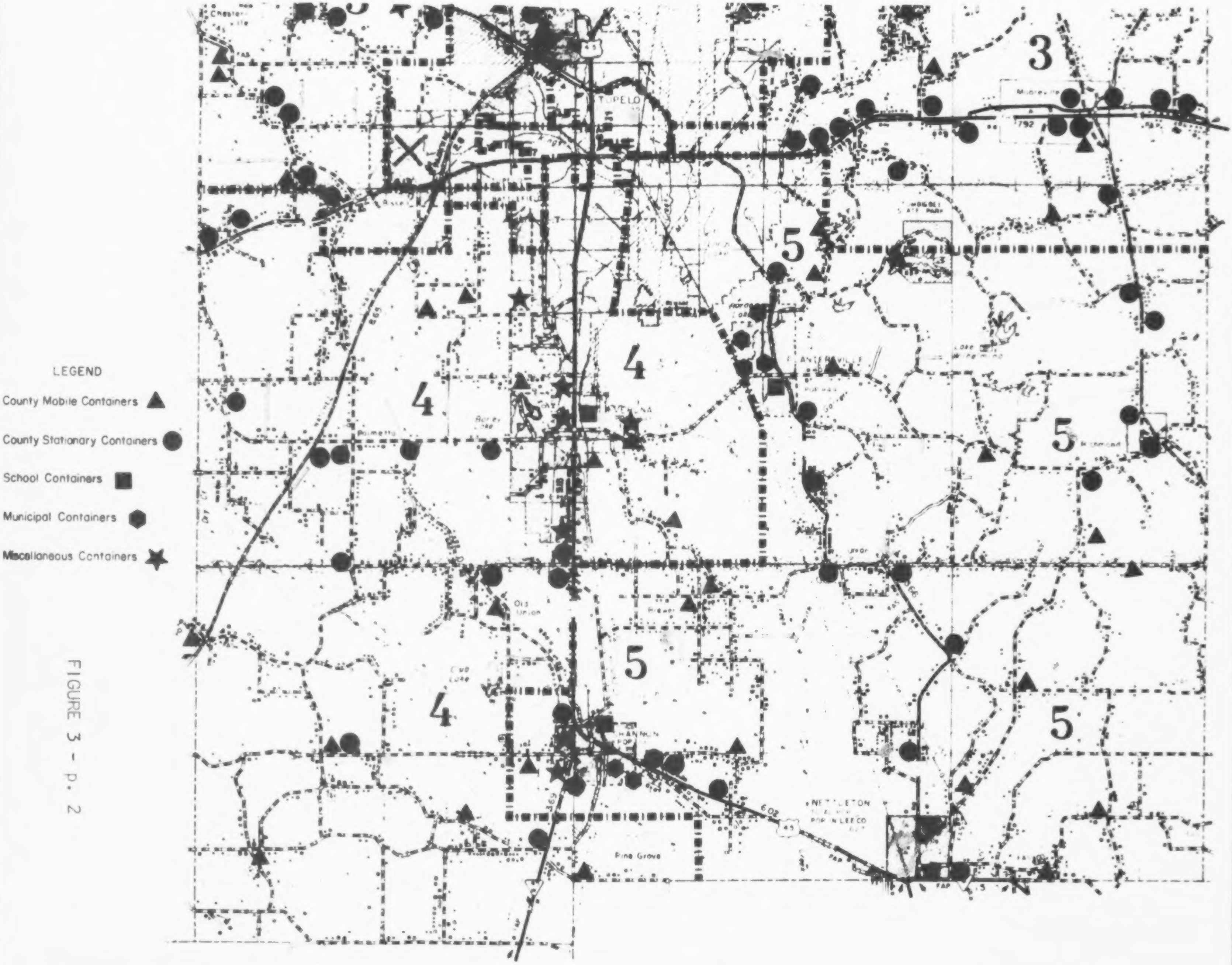

LEGEND
County Mobile Containers ▲
County Stationary Containers ●
School Containers ■
Municipal Containers ⬢
Miscellaneous Containers ★
3
4
4
4
4
5
5
5
5
5
Tupelo
Mooreville
Plantersville
Palmetto
Old Union
Shannon
Nettleton
Pine Grove
Richmond
Chesterville

FIGURE 3 - p. 2

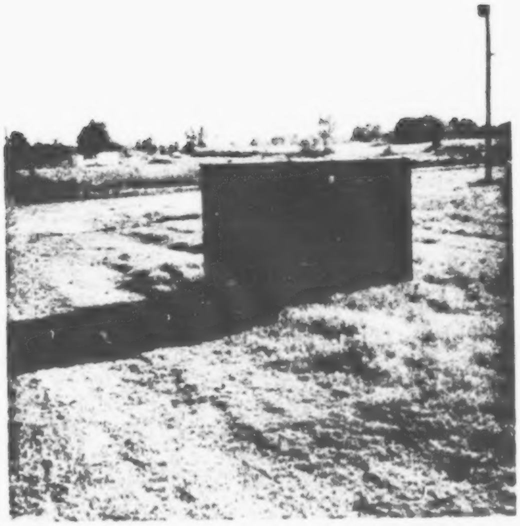
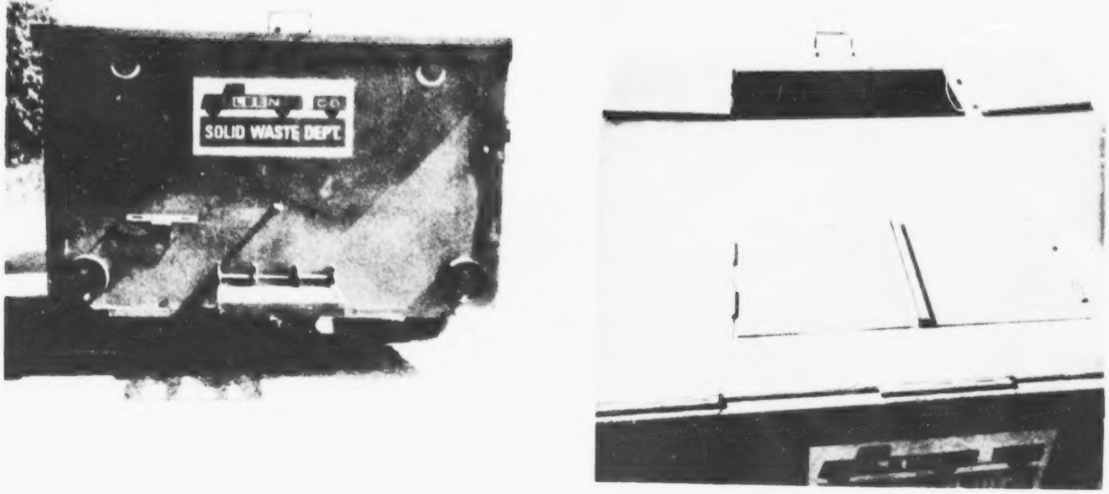
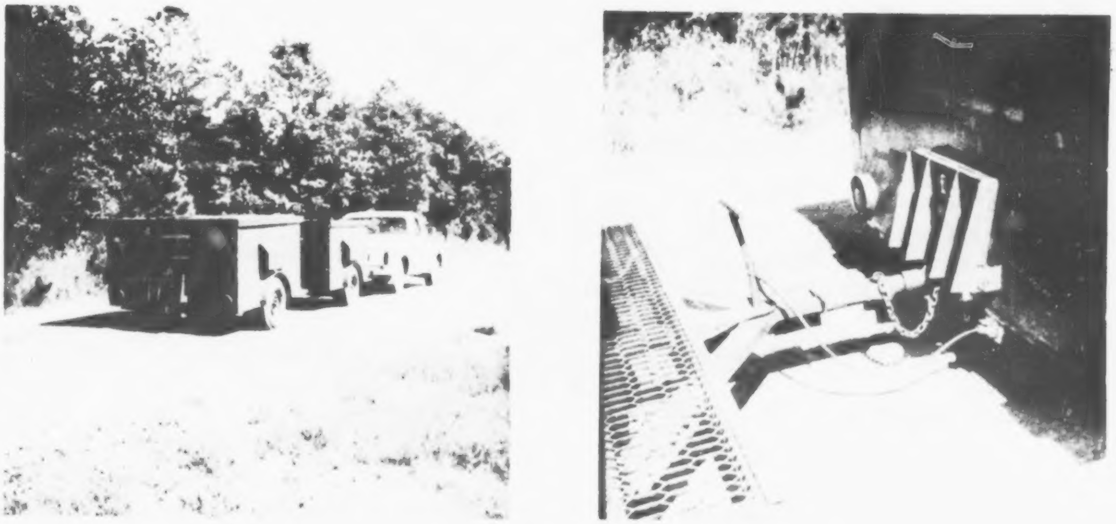


Figure 4. Six cubic yard stationary container chosen for use on primary road system.



Rear loading platform, rear lights and reflectors; identification markings

Easy-access top loading doors



Tandem-hookup feature

Tandem-hookup assembly

Figure 5. Five cubic yard mobile containers chosen for rural collection.

Figure 6. Mobile container located on typical rural collection site.

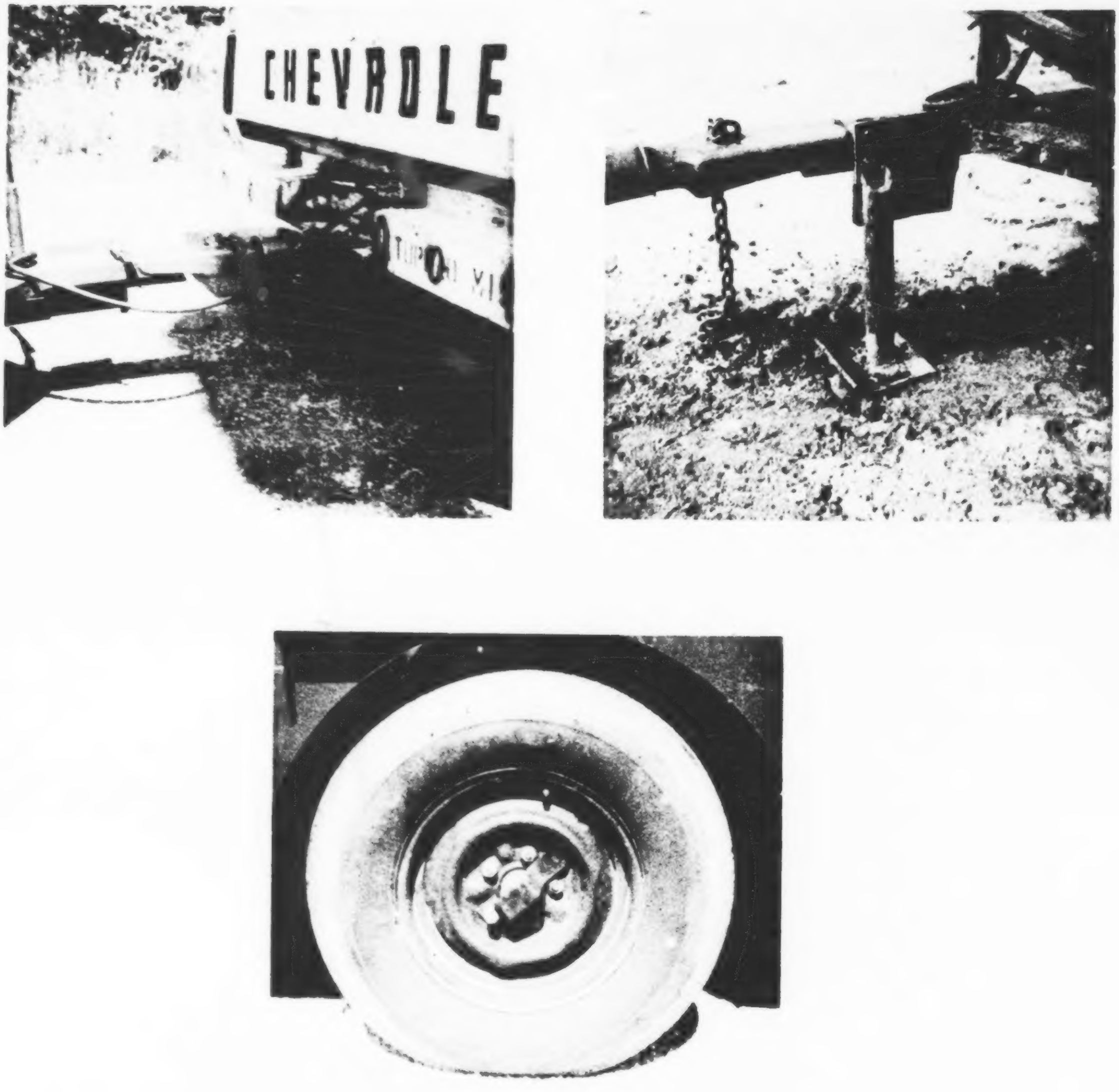


Figure 7. Mobile container connection, folding leg, and wheel locking features.

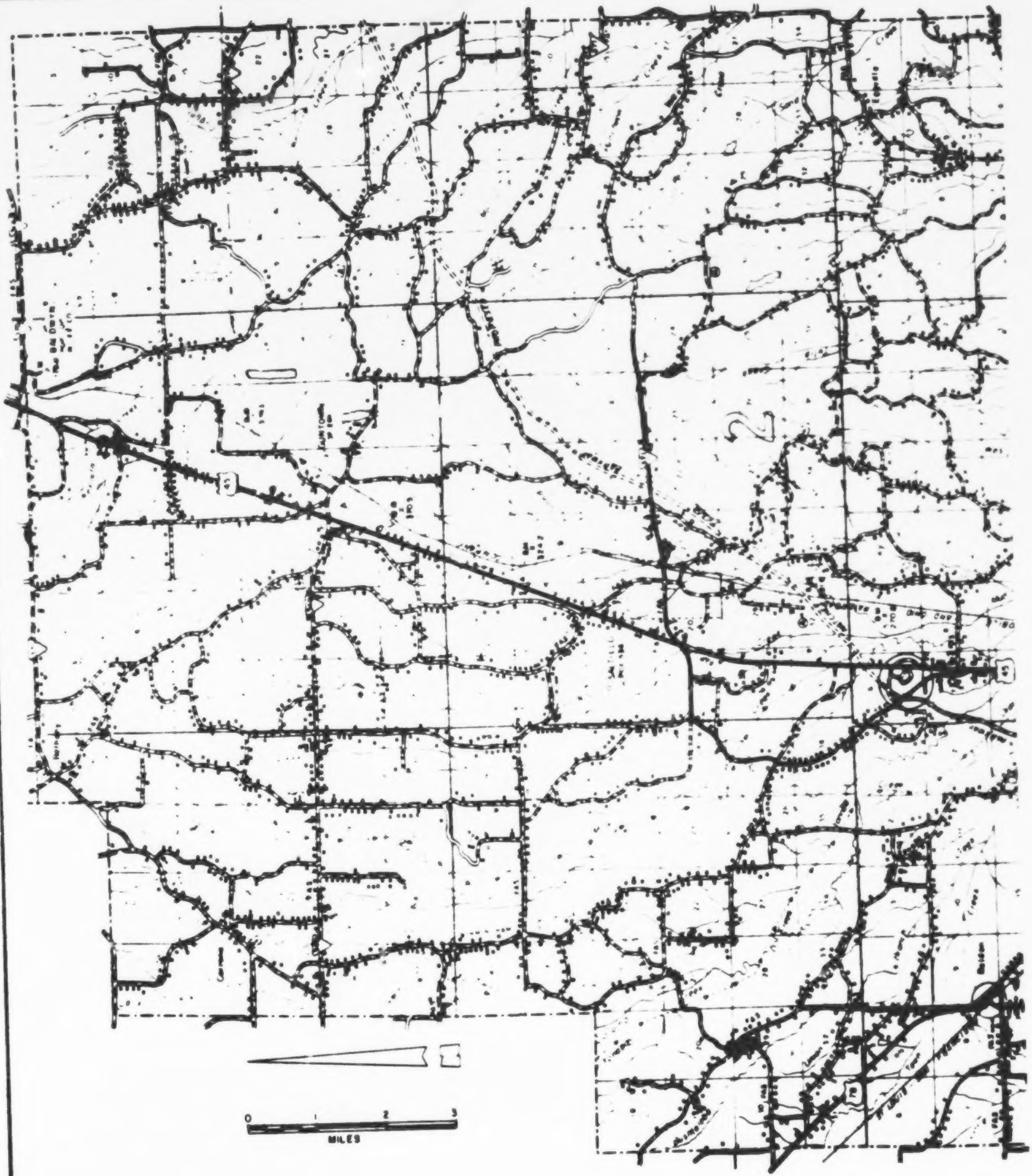
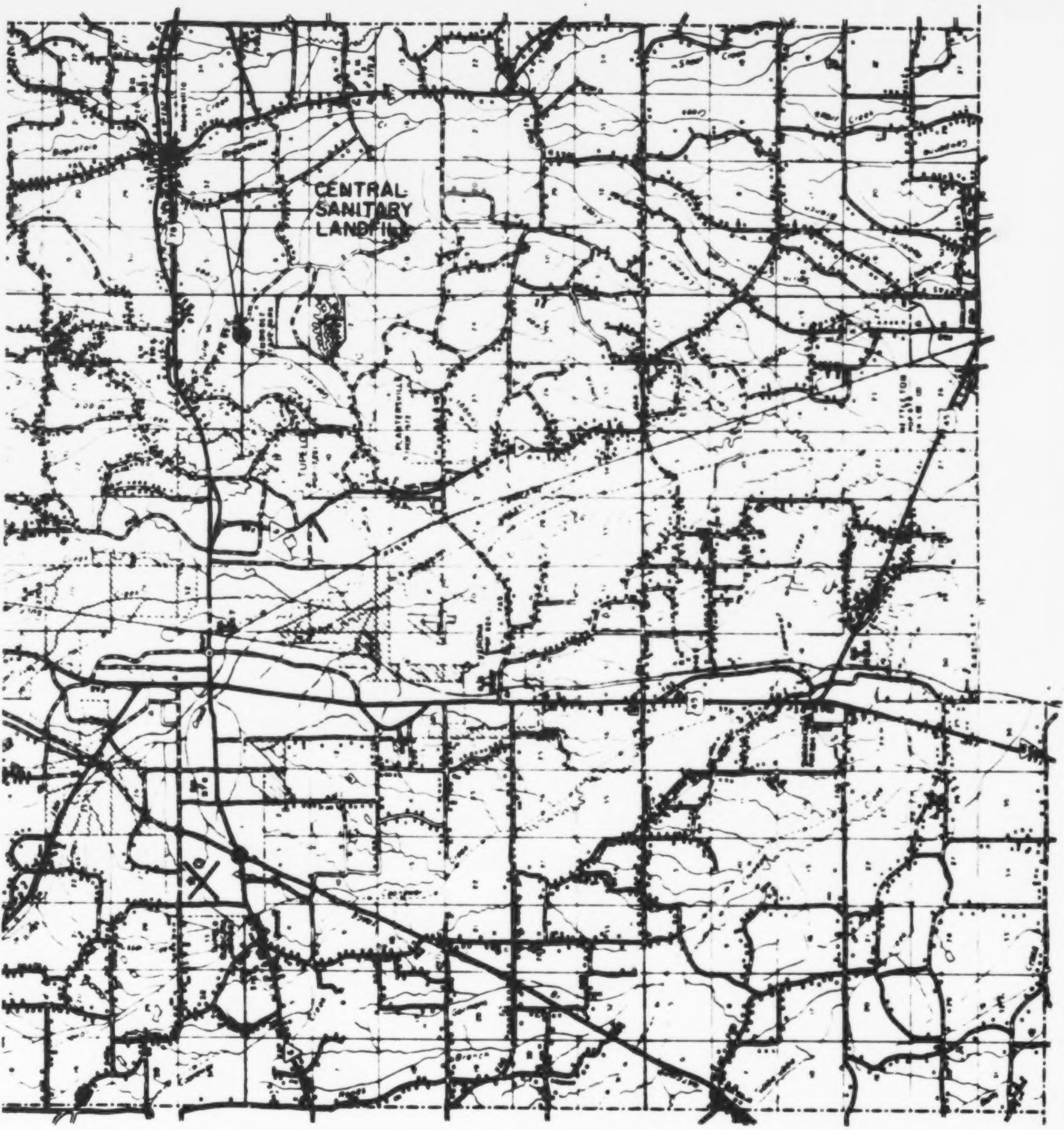


FIGURE 8 - p. 1


CENTRAL
SANITARY
LANDFILL

FACILITIES LOCATION

FIGURE 8 - p. 2

Reproduced from best available copy.

Figure 9. Scalehouse designed for Lee County Solid Waste Disposal Project.

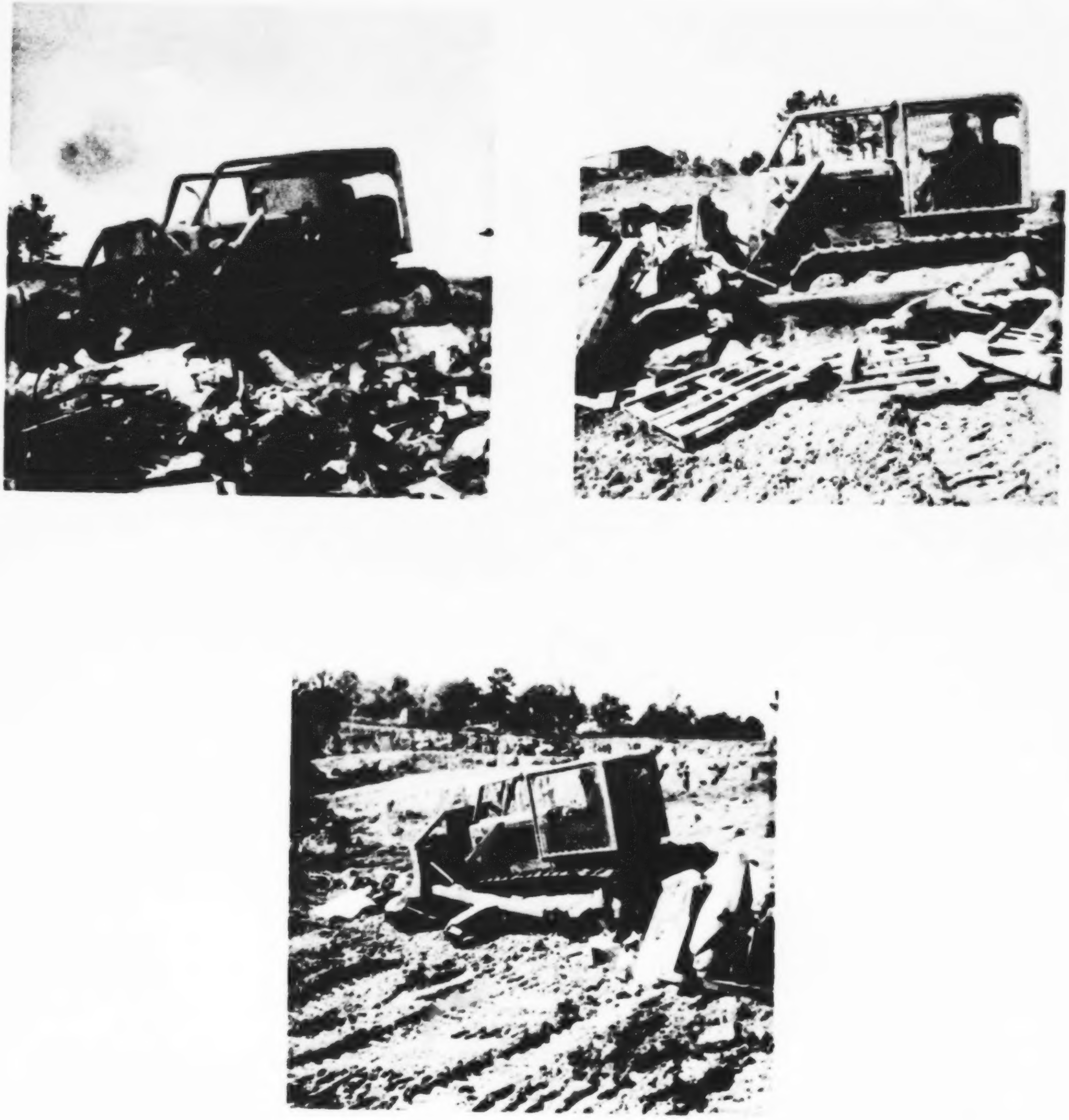
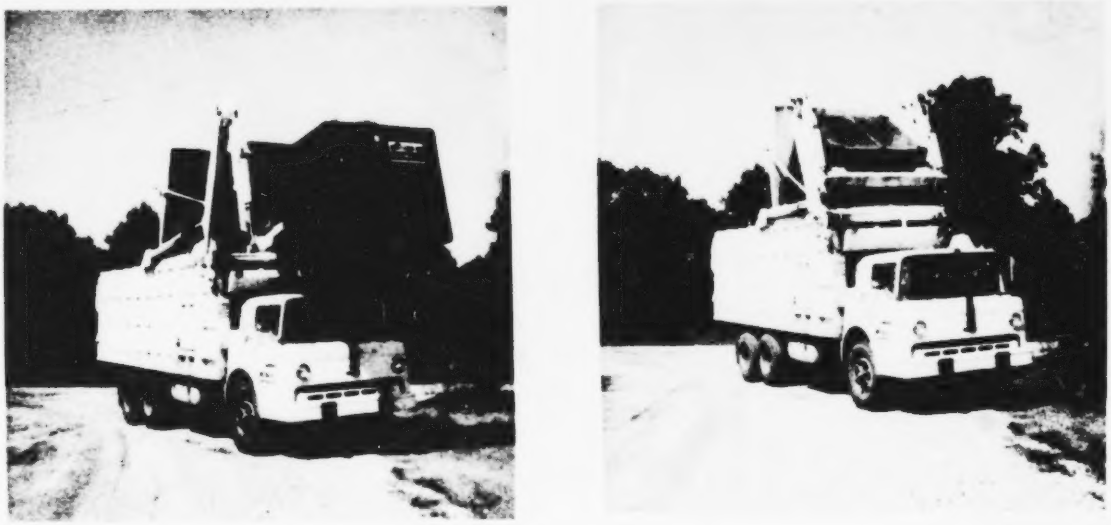
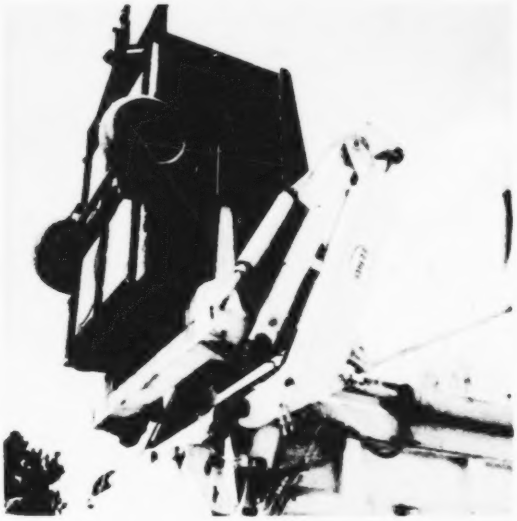


Figure 10. Landfill tractor shown spreading and compacting dumped wastes.



Packer truck emptying six cubic yard stationary containers



Packer truck emptying five cubic yard mobile container

Figure 11. Thirty cubic yard packer truck shown emptying collection containers.

THE ANSWERS TO THESE QUESTIONS ARE BASED ON YOUR ACTIONS PRIOR TO JUNE 1, 1971

1. Do your neighbors take pride in the appearance of your neighborhood?
   ( ) Yes ( ) No

2. Is trash and garbage dumped or scattered on roadsides near you?
   ( ) Yes ( ) No

3. Is trash and garbage dumped on private property near you?
   ( ) Yes ( ) No

4. If answer to 2 or 3 is yes, do you think that unauthorized dumping contributes to the menace of:
   ( ). Stray dogs ( ) Rats and Mice
   ( ) Insects (Flies, Mosquitoes, Yellowjackets, Gnats)

5. Are unusual odors present in your neighborhood?
   ( ) Yes ( ) No

6. If yes, what source or sources contribute to the odor problems?
   ( ) Garbage ( ) Trash ( ) Burning ( ) Industrial Wastes

7. How often is your trash or garbage collected?
   ( ) Once Week ( ) Twice Week ( ) Less Frequently
   ( ) No collection service

8. How long have you had this collection service?
   ( ) 1 year ( ) 2 years ( ) 2-5 years ( ) over 5 years

9. If answer to No. 7 is "No collection service", do you have place to dispose of your trash or garbage?
   ( ) Yes ( ) No

10. How far to dump used:
    ( ) 0-1 miles ( ) 1-2 miles ( ) 2-4 miles ( ) 5 miles

11. How often did you take garbage to dump:
    ( ) 1 time per week ( ) 2 times per month ( ) 1 time per month

12. Would you say your present method of trash or garbage collection and disposal is:
    ( ) Excellent ( ) Adequate ( ) Bad

13. Do you burn your flammable materials (Papers, cardboard, etc.) and dispose of your non-flammable materials (cans, bottles, etc.,) in another manner?
    ( ) Yes ( ) No

14. What type garbage or trash container do you use?
    ( ) Metal barrel ( ) Metal Can ( ) Paper sacks ( ) Cardboard boxes

15. How much are you charged for trash or garbage collection?
    ($\_\_\_\_\_\_\_\_\_\_month) ($_______trip) ( ) Free Service ( ) Don't know

16. Were you previously aware that Lee County is developing a Solid Waste collection and disposal program?
    ( ) Yes ( ) No.

Figure 13. User Inquiry Form sent to random sample of Lee County residents

ATTITUDE AND USAGE SURVEY

Dear Lee County Resident:

The Board of Supervisors is conducting a survey for Lee County to determine if you and your neighbors are satisfied with the present garbage collection and disposal system. Questionnaires have been sent to a random sample of families in your neighborhood.

In order to aid Lee County in its attempt to operate the garbage system the way you would like, we would appreciate it if you would answer a few simple questions. Your responses to all the questions will not be made public. After completing the questionnaire, please return it in the enclosed envelope which is addressed and stamped.

1. How many years have you lived in Lee County?

Number of years ( )

Please place a check in the box next to the correct answer for each question.

2. How does this county compare with other areas that you are familiar with?

Far Superior ( )

Superior ( )

About the same ( )

Inferior ( )

Far Inferior ( )

3. Do you think Lee County has a good garbage system?

Yes ( )

No ( )

4. The distance between your home and the nearest "Green Box" garbage container is -

Less than one mile ( )

Between 1 and 2 miles ( )

2 to 5 miles ( )

More than 5 miles ( )

Figure 13A Attitude and Usage Survey

5. Do you deposit your garbage in a "Green Box"?

Yes ☐
No ☐

If the answer to question 5 is "no" please skip to question #18.

6. On the average how often do you carry waste to one of the containers?

Daily ☐
3 times a week ☐
1 or 2 times a week ☐
At irregular intervals ☐

7. Means of transportation of waste to "Green Box":

Sedan ☐
Trailer ☐
Heavy truck ☐
Station wagon ☐
Pickup ☐
Other ☐

8. Are trips to the "Green Box" usually made:

For that purpose only ☐
When going shopping ☐
When going to work ☐
When going to visit friends or relatives ☐
At odd times in connection with one or more of the above ☐

9. What type container do you use to transfer waste from home to the "Green Box"?

Cardboard or wooden boxes ☐
Paper or plastic bags ☐
Metal or plastic containers ☐
Loose ☐
Other ☐

10. List those in your household who take waste to the "Green Box":

Family Position	Age	Sex	General Health
____________	___	___	E G F P
____________	___	___	E G F P
____________	___	___	E G F P
____________	___	___	E G F P

E - excellent
G - good
F - fair
P - poor

11. Normally the "Green Box" container is -

Empty ( )
Partially filled ( )
Fairly full ( )
Overflowing ( )

12. Do you think the "Green Box" -

is emptied often enough ( )
occasionally needs a special pickup ( )
needs an additional pickup per week ( )
needs several more pickups per week ( )

13. A "Green Box" receptacle -

should be placed closer to my home ( )
is close enough to my home ( )
is too close to my home ( )

14. How does this container service compare with your former method of handling garbage?

Vastly Superior ( )
Superior ( )
About the same ( )
Inferior ( )
Far Inferior ( )

15. Normally the parking and walking area around the container is -

Neat and clean ( )
Somewhat littered ( )
Strewn with refuse ( )
Foul and smelly ( )
None of the above ( )

16. Do you think it would be better if the area for walking and parking around the "Green Box" were paved?

Yes ( )
No ( )

17. For each item below please place a check in the box which best describes your experience with the present garbage collection and disposal system.

	Always occurs	Often occurs	Occurs at infrequent occasions	Never occurred
a. Receptacle filled	( )	( )	( )	( )
b. Smell so bad that couldn't use box	( )	( )	( )	( )
c. Fire in container	( )	( )	( )	( )
d. Area for parking car unuseable due to mud	( )	( )	( )	( )
e. Box was broken and couldn't use	( )	( )	( )	( )
f. Doors to box are hard to use	( )	( )	( )	( )
g. Litter in box area made it impossible to dump in box	( )	( )	( )	( )
h. Box moved without telling user new location	( )	( )	( )	( )
i. Flies were so bad around box that I could not get to it	( )	( )	( )	( )

18. Have you seen the Lee County Landfill?

Yes ( )
No ( )

If the answer to question 18 is no, skip to question 20.

19. How would you describe the maintenance of the landfill area?

Always neat ( )

Usually neat ( )

Garbage strewn all over ( )

Very unsightly ( )

A few questions about the total garbage system.

20. How would you rate this garbage disposal service overall?

Outstanding ( )

Very good ( )

Satisfactory ( )

Needs improvement ( )

Unsatisfactory ( )

21. Would you prefer a different type of garbage service?

Yes ( )

No ( )

If the answer to question 21 is yes, please specify type desired______________

____

22. If you suggested a different type of service in question 21, would you be willing to pay a garbage collection fee for it?

Yes ( )

No ( )

23. Please describe any other problem you may have encountered in trying to use the "Green Box" system.

____

____

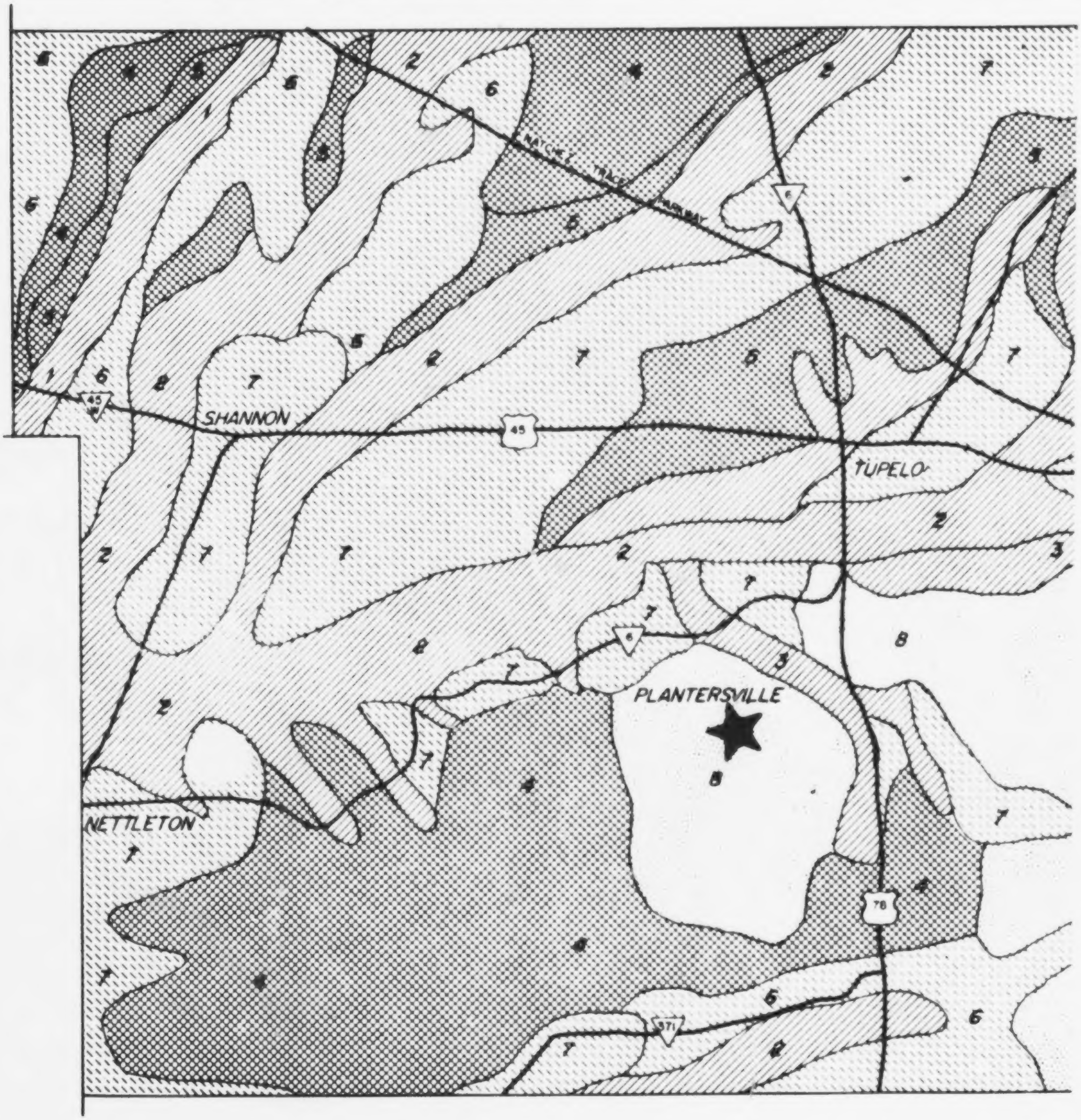
____

24. How do you dispose of any wastes not taken to the "Green Box"?
(check all applicable answers)

Burning	( )
Burying on private property	( )
Composting	( )
All wastes taken to container	( )
Other	________

25. Number of persons in this household (include renters, companions who live there, etc.) ( )

Thank you for your cooperation in completing this questionnaire.



LEGEND

▨ AREAS DOMINATED BY ACID AND NONACID LOAMY AND CLAYEY SOILS SUBJECT TO FLOODING

1. Leeper-Catalpa Association: Somewhat poorly to moderately well drained medium acid in mildly alkaline clayey soils on nearly level stream bottoms.
2. Leeper-Marietta Association: Somewhat poorly drained clayey and loamy soils on wide stream bottoms.
3. Mantachie-Marietta Association: Somewhat poorly and moderately well drained loamy soils on wide stream bottoms.

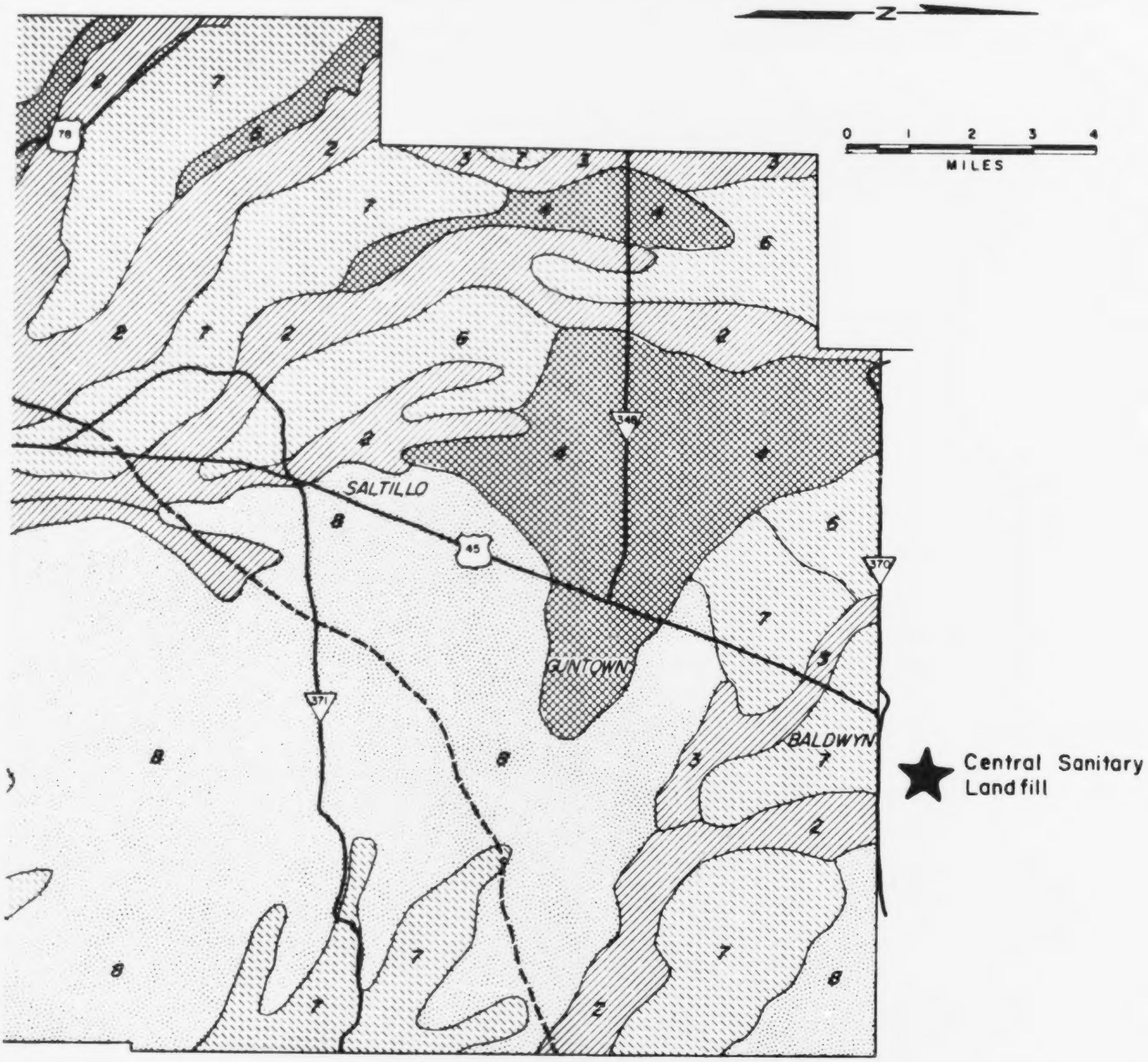
▩ AREAS DOMINATED BY ACID AND ALKALINE UNSTABLE CLAYEY SOILS OVER CHALK OR MARL

4. Oktibbeha-Providence Association: Moderately well drained clayey and silty soils on gently to strong slopes.
5. Oktibbeha-Gullied land-Demopolis Association: Moderately well drained clayey acid and calcareous soils on gentle to steep severely eroded slopes.

▧

░

FIGURE 14 -
p. 1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MILES
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7
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6
2
348
2
4
4
SALTILLO
8
45
6
370
7
GUNTOWN
3
371
BALDWYN
8
8
3
7
Central Sanitary Landfill
2
8
7
7
7
8
2

AREAS DOMINATED BY SOILS WITH FRAGIPANS

6 Ora-Quitman-Oktibbeha Associations: Moderately well and somewhat poorly drained loamy and clayey soils on nearly level to strong slopes.

7 Ora-Prentiss-Quitman Association: Moderately well and somewhat poorly drained loamy soils with fragipans on nearly level to moderate slopes.

AREAS DOMINATED BY DEEP WELL DRAINED LOAMY AND CLAYEY SOILS

8 Cahaba-Luverne-Gullied land-Ora Association: Moderately well to well drained loamy and clayey soils on moderate to very steep uplands.

SOIL STRUCTURE MAP
LEE COUNTY, MISS.

FIGURE 14 - p. 2

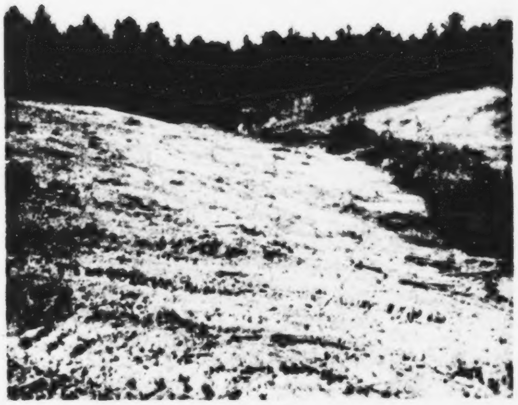
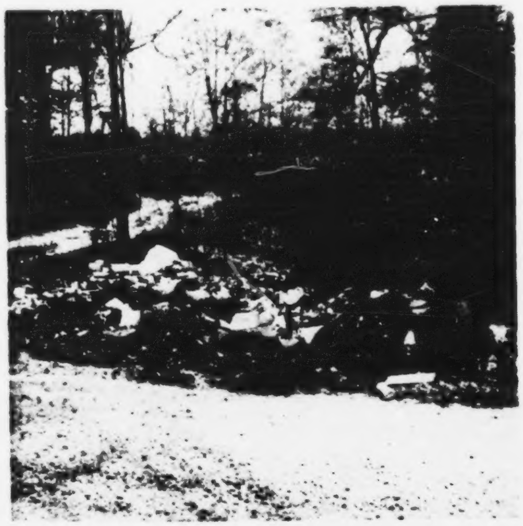
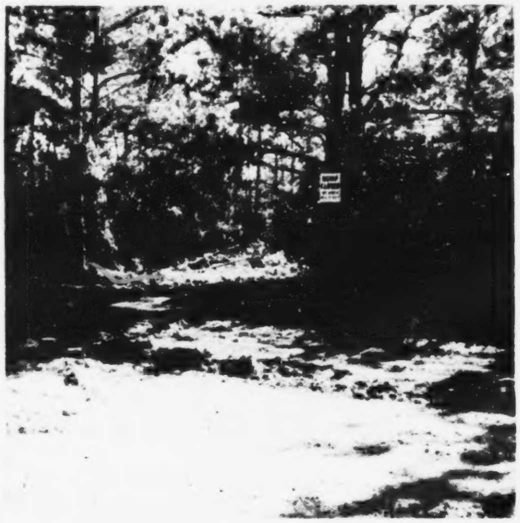


Figure 15. Landfill site chosen for initial fill with clearance of trees in progress.





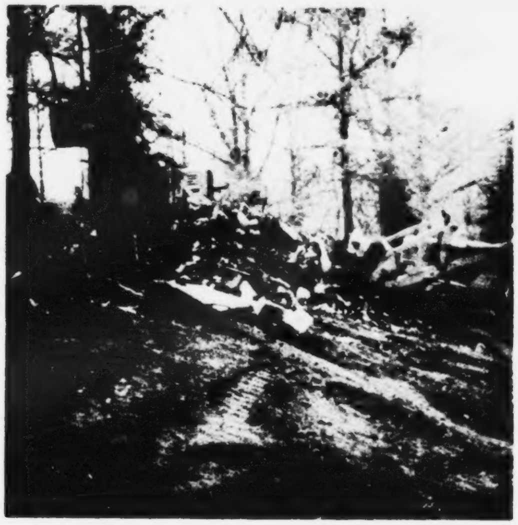
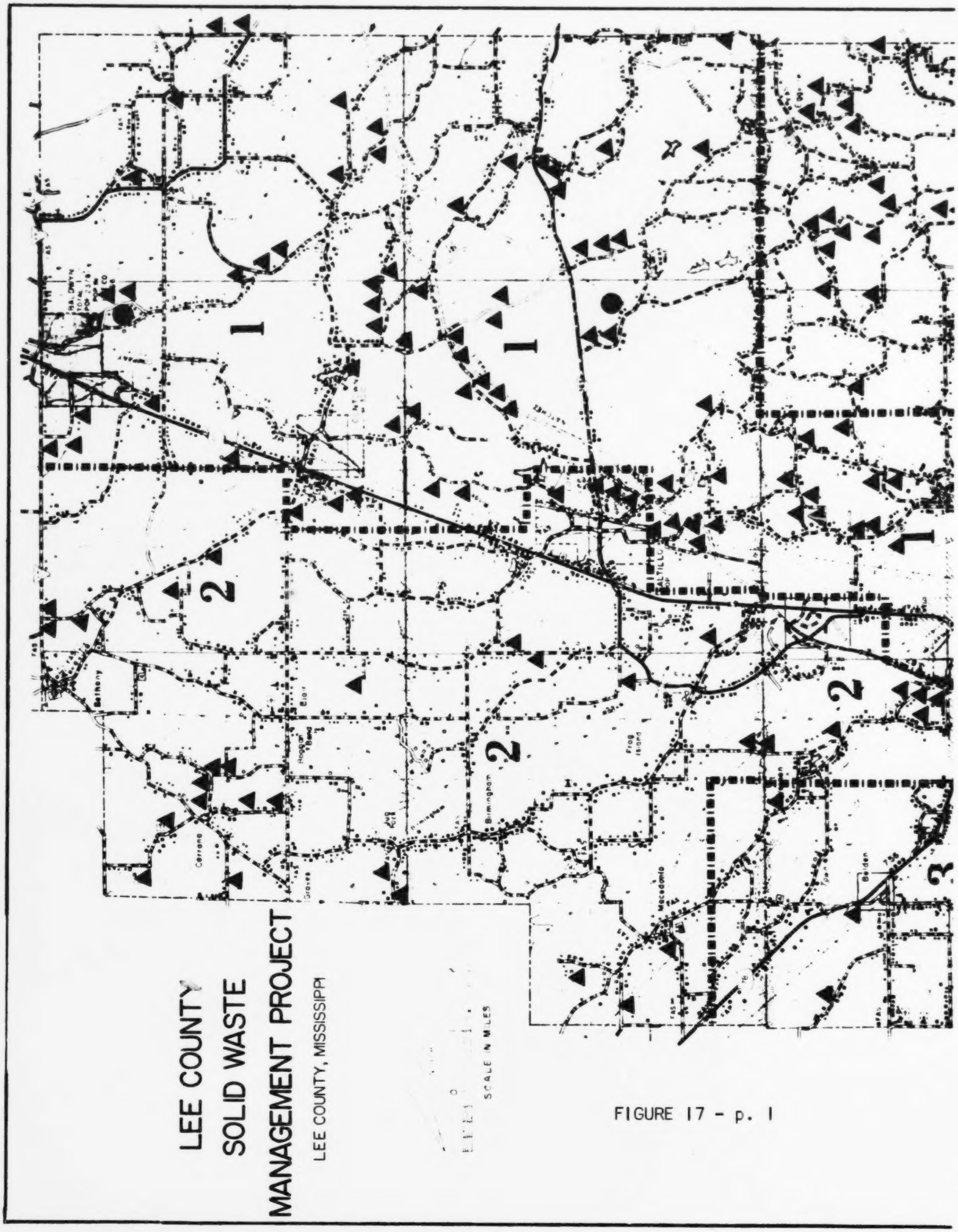


Figure 16 - Typical Dumping Area Rehabilitation

Sheet 1 of 2

Figure 16 - Continued

Sheet 2 of 2


LEE COUNTY
SOLID WASTE
MANAGEMENT PROJECT
LEE COUNTY, MISSISSIPPI
SCALE IN MILES
1
1
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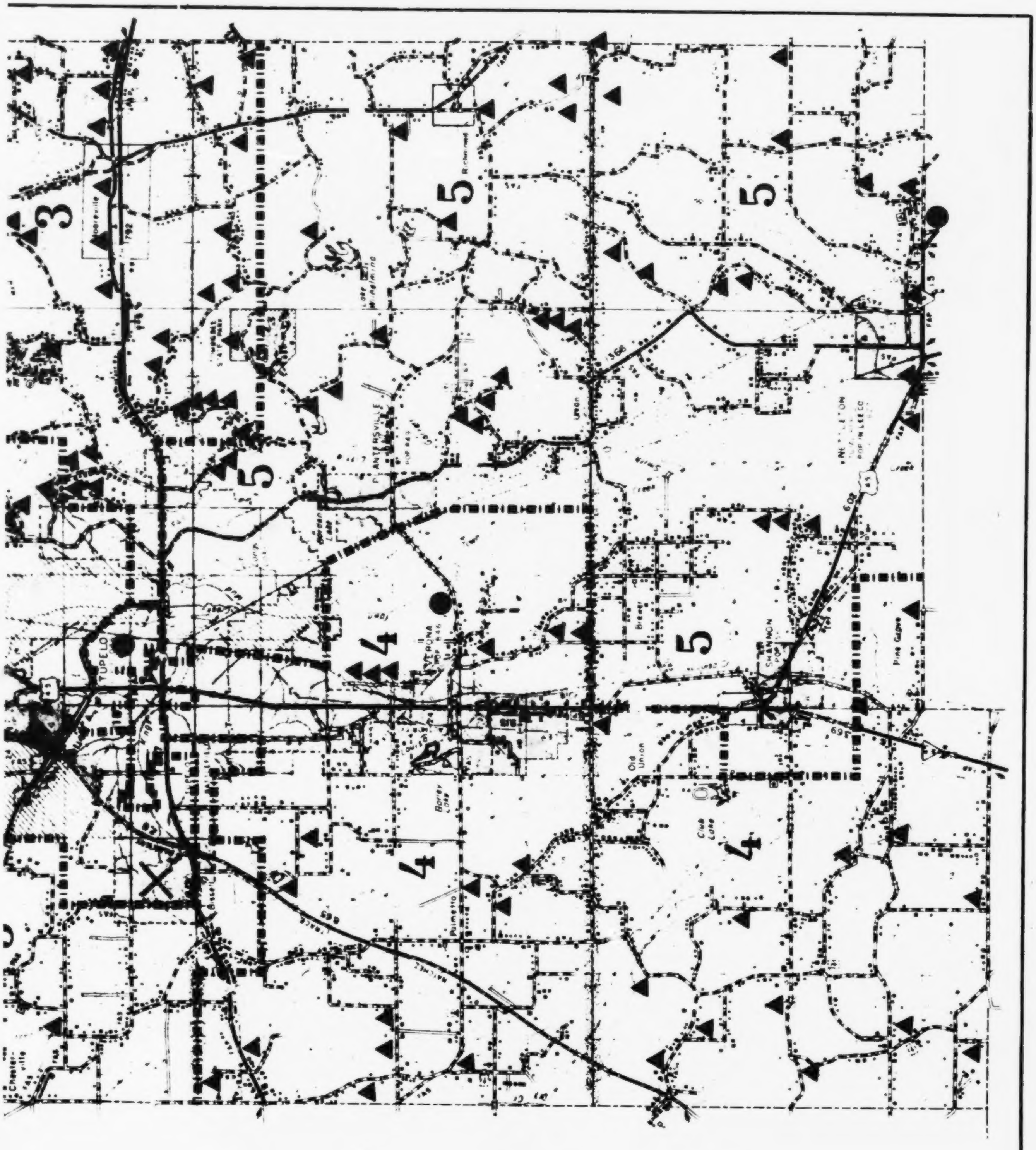
2
2
2
2
3
Bethany
Birmingham
Frog Island
Macedonia
Belden
Saltillo

FIGURE 17 - p. 1



3
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5
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5
4
4
4
4
Tupelo
Verona
Shannon
Nettleton
Old Union
Palmetto
Pine Grove

LEGEND

Rehabilitated Municipal Dumps ●

Rehabilitated Rural Dumps ▲

FIGURE 17 - p. 2

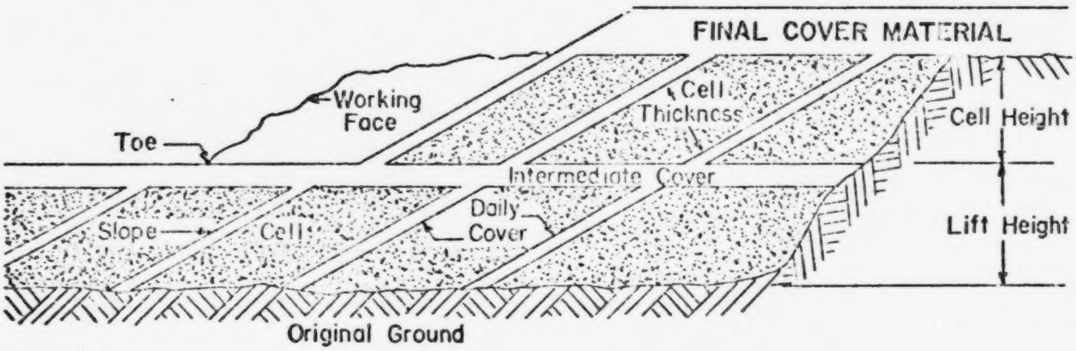

FINAL COVER MATERIAL
Working Face
Toe
Cell
Thickness
Cell Height
Intermediate Cover
Slope
Cell
Daily Cover
Lift Height
Original Ground

Figure 18 SANITARY LANDFILL CONSTRUCTION

μσ 1138

APPENDIX A

Report of Borings and Soils Analyses for Lee County Sanitary Landfill Site

P. O. BOX 631
STATE COLLEGE, MISSISSIPPI

703 CROSSOVER ROAD
TUPELO, MISSISSIPP

FOUNDATION SERVICES, INC.

Lab Nos. 1, 2, 3, 4, 5 Project G06-EC-00315

REPORT ON SAMPLES OF LEE COUNTY SOLID WASTE PROJ. County LEE

Submitted by B. G. COGGIN, JR., COUNTY ENGINEER Sampled by R. BOYD

Reported to ENVIRONMENTAL PROTECTION AGENCY Date Sampled 6-10-71

Producer Date Received 6-10-71

Date Reported 6-12-71

TEST RESULTS*

Lab. No.	1	2	3	4	5			
Sample No.	I	II	III	IV	V			
Station No.	B-1	B-1, B-4	B-1, B-3	B-1, B-2	B-3, B-4			
Quantity Rep.	1 lb.	1 lb.	1 lb	1 lb.	1 lb.			
SIEVE ANALYSIS—TOTAL % PASSING BY WEIGHT (SQUARE OPENINGS)								
No. 2" Sieve	100	100	100	100	100			
No. 1¾" Sieve	"	"	"	"	"			
No. 1½" Sieve	"	"	"	"	"			
No. 1" Sieve	"	"	"	"	"			
No. ½" Sieve	"	"	"	"	"			
No. 4 Sieve	"	"	"	"	"			
No. 10 Sieve	"	"	"	"	"			
% Voids above No. 10	NA	NA	NA	NA	NA			
Wgt. in Lbs./Cu. Ft.	"	"	"	"	"			
MECHANICAL ANALYSIS MATERIAL PASSING NO. 10 SIEVE								
% Pass No. 10 Sieve	100	100	100	100	100			
% Pass No. 40 Sieve	85	85	94	93	94			
% Pass No. 60 Sieve	35	25	32	68	49			
% Pass No. 200 Sieve	2	2	5	7	6			
% Pass No. 270 Sieve	8	9	27	13	24			
% Silt	2	3	16	3	4			
% Clay	6	6	11	10	10			
% Colloids	NA	NA	NA	NA	NA			
Dust Ratio**	2	2	5	7	6			
Consistency	NA	NA	NA	NA	NA			
GROUP								
PHYSICAL CHARACTERISTICS MATERIAL PASSING NO. 40 SIEVE								
Liquid Limit				29				
Plastic Limit				23				
Plasticity Index	NP°	NP°	NP°	6	NP°			
Shrinkage Limit	NA	NA	NA	NA	NA			
Shrinkage Ratio	"	"	"	"	"			
Centrifuge Moisture	"	"	"	"	"			
Field Moisture	12	11	20	23	14			
Volume Change	NA	NA	NA	NA	NA			

*Particles above 0.074 mm. in diameter by sieve method; particles below 0.074 mm in diameter by hydrometer method.
**Percentage of material finer than No. 40 sieve passing No. 200 sieve.

REMARKS:

°NP - NON - PLASTIC MATERIAL

Reported by TOMMY DABBS

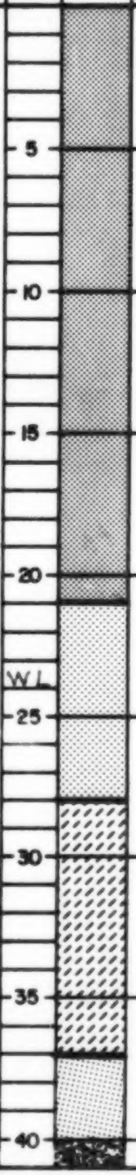
FOUNDATION SERVICES INCORPORATED

703 CROSSOVER ROAD · TUPELO, MISSISSIPPI · 38801

LOG OF TEST BORING

PROJECT: LEE COUNTY SOLID WASTE PROJECT

BORING NUMBER: 1 **JOB NUMBER:** 5-1237 **DATE:** 6-10-71



SAMPLE	DEPTH	N	DESCRIPTION OF MATERIAL	UNCONFINED COMPRESSIVE STRENGTH-ksf	% FIELD MOISTURE	LIQUID LIMIT	PLASTICITY INDEX
	5						
	10		BROWN SAND (I)				
	15						
	20						
	WL						
	25		TAN SAND (II)				
	30						
	35		TAN CLAYEY SAND (III)				
			TAN SAND (II)				
	40		BLUE SANDY CHALK (IV)				

N = Blows per foot for 2" O.D. sampler driven with 140 lb. hammer falling 30" (STANDARD PENETRATION TEST)

ST = Shelby Tube Sample

WL = Water Level

NOTES:

SAMPLED BY: E. TIGNER

ENCLOSURE NO.

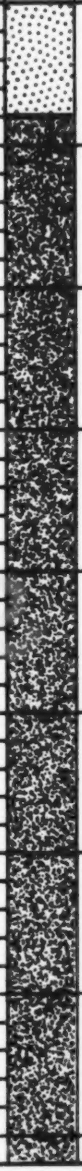
FOUNDATION SERVICES INCORPORATED

703 CROSSOVER ROAD · TUPELO, MISSISSIPPI · 38801

LOG OF TEST BORING

PROJECT: LEE COUNTY SOLID WASTE PROJECT

BORING NUMBER: 2 **JOB NUMBER:** 5-1237 **DATE:** 6-10-71



SAMPLE	DEPTH	N	DESCRIPTION OF MATERIAL	UNCONFINED COMPRESSIVE STRENGTH-ksf	% FIELD MOISTURE	LIQUID LIMIT	PLASTICITY INDEX
			RED SAND (V)				
	5		BLUE SANDY CHALK (IV)				
	10						
	15						
	20						
	25						
	30						
	35						
	40						

N = Blows per foot for 2" O.D. sampler driven with 140lb. hammer falling 30" (STANDARD PENETRATION TEST)

ST = Shelby Tube Sample

WL = Water Level

NOTES:

SAMPLED BY: E. TIGNER

ENCLOSURE NO.

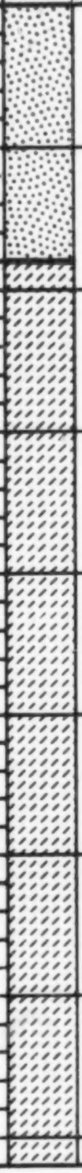
FOUNDATION SERVICES INCORPORATED

703 CROSSOVER ROAD · TUPELO, MISSISSIPPI · 38801

LOG OF TEST BORING

PROJECT: LEE COUNTY SOLID WASTE PROJECT

BORING NUMBER: 3 JOB NUMBER: 5-1287 DATE: 6-10-71



SAMPLE	DEPTH	N	DESCRIPTION OF MATERIAL	UNCONFINED COMPRESSIVE STRENGTH-ksf	% FIELD MOISTURE	LIQUID LIMIT	PLASTICITY INDEX
	5		RED SAND (X)				
	10						
	15		TAN CLAYEY SAND (III)				
	20						
	25						
	30						
	35						
	40						

N = Blows per foot for 2" O.D. sampler driven with 140lb. hammer falling 30" (STANDARD PENETRATION TEST)

ST = Shelby Tube Sample

WL = Water Level

NOTES:

SAMPLED BY: E. TIGNER

ENCLOSURE NO.

FOUNDATION SERVICES INCORPORATED

703 CROSSOVER ROAD · TUPELO, MISSISSIPPI · 38801

LOG OF TEST BORING

PROJECT: LEE COUNTY SOLID WASTE PROJECT

BORING NUMBER: 4 **JOB NUMBER:** 5-1237 **DATE:** 6-10-71

SAMPLE	DEPTH	N	DESCRIPTION OF MATERIAL	UNCONFINED COMPRESSIVE STRENGTH-ksf	% FIELD MOISTURE	LIQUID LIMIT	PLASTICITY INDEX
	5		RED SAND (I)				
	10						
	15						
	20		TAN SAND (II)				
	25						
	30						
	35						
	40						

N = Blows per foot for 2" O.D. sampler driven with 140 lb. hammer falling 30" (STANDARD PENETRATION TEST)

ST = Shelby Tube Sample

WL = Water Level

NOTES:

SAMPLED BY: E. TIGNER

ENCLOSURE NO.

APPENDIX B

Accounting Forms

WEEKLY LABOR TICKET

FORM NO. I

SITE: ______________________ DATE: ______________________

EMPLOYEE	DAY 1		DAY 2		DAY 3		DAY 4		DAY 5		DAY 6		DAY 7		INDI- VIDUAL TOTALS	NOTE CAUSES OF ABSENCES, EXTRA HRS. TO BE PAID, ETC.
IDENTIFICATION	JOB	HRS	JOB	HRS	JOB	HRS	JOB	HRS	JOB	HRS	JOB	HRS	JOB	HRS		
TOTALS	X		X		X		X		X		X		X			

*LFS = Landfill Supervisor, S = Secretary, TO = Tractor Operator (Divide activity into [s]-spread & compact refuse and [c]-cover operation, EM = Equipment Maintenance, US = Unloading Supervisor, AO = Asistant Operator, TTD = Tow Truck Driver, CTD = Collector Truck Driver, MCTD = Municipal Collector Truck Driver, L = Loader

COLLECTION ACTIVITY REPORT

FORM 2

TIME OUT: ________ TIME IN: ________ NET TIME: ________ DATE: ________

MILEAGE OUT: ______ MILEAGE IN: ______ NET MILEAGE ________ TRUCK NO.: ________

DRIVER:	REMARKS
LOADER:	
LOADER:	
LOADER:	
LOADER:	

START		FINISH		
TIME	MILEAGE	TIME	MILEAGE	ROUTE IDENTIFICATION
TOTAL WEIGHT:				

FUEL (GAL): ________

OIL (QTS): ________

HYD. FLUID (GAL): ________

ENGINE TIME (HRS): ________

CHECK IF NOT NORMAL:

ENGINE TEMP.: ________
OIL PRESSURE: ________
AMMETER: ________
PACKER: ________
LIGHTS: ________
OTHER: ________

CHECK AND REPORT TO THE SUPERVISOR IF YOU HAVE:

PERSONAL INJURY: ________
AUTO. ACCIDENT: ________

INSTRUCTIONS: The driver is to complete this form each day. "Time out" and "mileage out" are to be completed when the truck leaves the garage in the morning. "Time in" and "mileage in" are to be completed at the end of the day when the truck is back at the garage. When the truck reaches the first route the time and mileage is noted in the "start" column and the route designation is also noted. When the truck is full or the route is left for any reason "Time & mileage finish" is entered. Upon returning to the same route or another (after a trip to the disposal site) the next "time and mileage start" entry is made. Also at the disposal site the net weight of wastes collected is entered. Accidents, injuries or any malfunctions of the equipment are to be noted in the boxes provided and a detailed explanation given on back of sheet. Remarks column to be used for comments relative to personell.

REPAIR AND MAINTENANCE RECORD FORM 4

TRUCK IDENTIFICATION ______________________ FOR PERIOD __________ THROUGH __________

DATE	ODO. MILEAGE	TYPE SERVICE OR REPAIR	HRS. DOWN	LABOR HRS.	PARTS DESCRIPTION	LABOR COST	PARTS COST	OUTSIDE CHARGE	OVERHEAD (Rate Hrs)	TOTAL COST
TOTALS										

FORM 7

CREW PERFORMANCE EVALUATION

DISTRICT____________________ FOR WEEK OF ____________________

CREW IDENT.	TOTAL PAID HOURS	% TOTAL HOURS ON ROUTE	TONS COLL-ECTED	TONS/HRS. ON ROUTE	#COMPLAINTS THIS WEEK	YR. TO DATE	WEIGHTED ROUTE DIFFICULTY	ADJUSTED TONS/HRS ON ROUTE
TOTALS								
AVERAGE								

---

[1] This factor should be completed based on past performance of all crews on each route; i.e., if on the average, "route A" takes twice as long to service as "Route B", then enter 2 for crew that did Route A and 1 for crew that did Route B.

[2] "Adjusted Tons/Hr. on Route" = ("Tons/Hr. on Route") . (weighted route difficulty) This is more representative of crew performance, adjusted for route differences.

FORM 9

VEHICLE PERFORMANCE EVALUATION

Garage______________________ For period: from________to_________

EQUIP. IDENT.	TOTAL MILES	HOURS DOWN	HRS. DOWN TOTAL HRS.	REPAIRS & MAINT. COST	FUEL COST	REPAIR & MAIN. PER/HR	FUEL COST /HR.	TOTAL COST /HR.	TOTAL COST
TOTALS									
AVERAGES									
BUDGET									

LANDFILL OPERATING COST REPORT

FOR: ☐ WEEK
☐ MONTH
☐ YEAR

PERIOD ENDING: mo. ☐☐ day ☐☐ yr. ☐☐

SITE: ______________________________

ACTIVITY

1.	Refuse quantity disposed	tons
2.	Cover material quantity	tons
3.	Man hours employed	hrs.
4.	Machine hours employed	hrs.

COSTS

5.	Labor wages	$
6.	Cover material costs	$
7.	Oil, gas, grease, etc.	$
8.	Equipment repairs and maintenance	$
9.	Electric, gas, heat, water, telephone	$
10.	Building repairs and maintenance	$
11.	Supervisor's salary	$
12.	Other costs	$

13.	TOTAL OPERATING COST (add #5 through #12)	$
14.	DEPRECIATION COST	$
15.	TOTAL COST	$

EFFICIENCY FACTORS

Cover Material Utilization (#2 ÷ #1)	. ton/ton
Labor Efficiency (#3 ÷ #1)	. hr/ton
Equipment Efficiency (#4 ÷ #1)	. hr/ton

UNIT COST FACTORS

Labor Cost per Ton Disposed (#5 ÷ #1)	$/ton
Cover Mat'l Cost per Ton Disposed (#6 ÷ #1)	$/ton
Operating Overhead Cost per Ton Disposed (#7 through #12 ÷ #1)	$/ton
TOTAL OPERATING UNIT COST (#13 ÷ #1)	$/ton
DEPRECIATION COST PER TON (#14 ÷ #1)	$/ton
TOTAL COST PER TON (#15 ÷ #1)	$/ton

FORM 10

TOTAL COLLECTION COST SUMMARY

DISTRICT ____________ PERIOD OF REPORT: From ________ to ________

DATA	FOR THIS PERIOD	BUDGET - THIS PERIOD	YEAR TO DATE	BUDGET - YEAR TO DATE
TONS OF REFUSE COLLECTED				
Total Operating Cost				
Total Financing & Ownership Cost				
TOTAL COST				
Operating Cost per Ton				
Financing & Ownership Cost Per Ton				
TOTAL COST PER TON				

INSTRUCTIONS: To be completed by the accounting department from data available in operating cost report, capital cost reports when requested, or periodically. Copies sent to the city manager (or his superior).

RURAL REFUSE COLLECTION COST SUMMARY

FOR: ☐ Month
☐ Year

Period Ending:

CODE: G06-EC-00315

ACTIVITY

Refuse Quantity (Rural Containers) ____________________ tons

Refuse Quantity (Gate Containers) ____________________ tons

1. Total Refuse Quantity ____________________ tons

Pickup Driver Manhours ____________________ hours

Packer Driver Manhours ____________________ hours

Supervision Manhours ____________________ hours

Other Manhours (specify) ____________________ hours

2. Total Manhours ____________________ hours

Pickup Truck Hours on Route ____________________ hours

Other Pickup Truck Hours ____________________ hours

Packer Truck Hours on Route ____________________ hours

Other Packer Truck Hours ____________________ hours

3. Total Machine Hours ____________________ hours

Pickup Truck Mileage on Route ____________________ miles

Other Pickup Truck Mileage ____________________ miles

Packer Truck Mileage on Route ____________________ miles

Other Packer Truck Mileage ____________________ miles

3A. Total Machine Miles ____________________ miles

COSTS

4. Labor Wages (+ fringe benefits) $ ____________

Oil, Gas, Grease, etc. Pickup Trucks $ ____________

Oil, Gas, Grease, etc. Packer Truck $ ____________

5. Total Oil, Gas, Grease, etc. $ ____________

Pickup Repairs + Maintenance Labor $ ____________

Parts $ ____________

Packer Repairs + Maintenance Labor $ ____________

Parts $ ____________

6. Total Repairs + Maintenance $ ____________

7. Supervisor's Salary $ ____________

8. Other Costs (specify) $ ____________

9. Total Operating Costs $ ____________

10. Depreciation Costs $ ____________

11. Total Costs $ ____________

EFFICIENCY FACTORS

12. Labor Efficiency #2/#1 ____________ manhours/ton

13. Equipment Efficiency #3/#1 ____________ machine hours/ton

COST FACTORS

14. Labor Cost per Ton Collected #4/#1 ____________ $/ton

15. Operating Overhead Cost per Ton Collected #5 through #8/#1 ____________ $/ton

16. Total Operating Cost per Ton Collected #9/#1 ____________ $/ton

17. Depreciation Cost per Ton Collected #10/#1 ____________ $/ton

18. Total Cost per Ton Collected #11/#1 ____________ $/ton

Form 6

FACILITY REPORT - DISPOSAL

SITE: ________________

DATE: ________________

(For use by acctg. dept. only)

DESCRIPTION		SIZE or AMOUNT	DATE of ACQ.	COST	EST. TOTAL LIFE	OTHER COMMENTS	ANNUAL DEPRECIATION	MONTHLY DEPRECIATION	
Original Land									
IMPROVEMENTS	Roads								
	Lights								
	Fences								
	Surveys								
	Other								
FACILITIES	Scales								
	Garages								
	Buildings								
	Other								
TOTALS		X	X	X	X	X			

Form 6

FACILITY REPORT - COLLECTION

SITE:____________________

DATE:_______________

(For use by acctg. dept. only)

DESCRIPTION		SIZE or AMOUNT	DATE of ACQ.	COST	EST. TOTAL LIFE	OTHER COMMENTS	ANNUAL DEPRECIATION	MONTHLY DEPRECIATION
Original Land								
IMPROVEMENTS	Roads							
	Lights							
	Fences							
	Surveys							
	Other							
FACILITIES	Scales							
	Garages							
	Buildings							
	Other							
TOTALS		X	X	X	X	X		

Form 7

EQUIPMENT REPORT - COLLECTION

SITE:________________ DATE:____________________

(for use by acctg. dept. only)

MFG. NAME	MODEL NO.	MODEL YEAR	TYPE	DATE of PURCH.	COST	EST. LIFE	% TIME USED BY OTHER DEPT.	ANNUAL DEPRECIATION	MONTHLY DEPRECIATION	
TOTAL	X	X	X	X		X	X			

Form 7

EQUIPMENT REPORT - DISPOSAL

SITE:____________________

DATE:____________________

(for use by acctg. dept. only)

MFG. NAME	MODEL NO.	MODEL YEAR	TYPE	DATE of PURCH.	COST	EST. LIFE	%TIME USED BY OTHER DEPT.	ANNUAL DEPRECIATION	MONTHLY DEPRECIATION	
TOTAL	X	X	X	X		X	X			

DAILY REFUSE SUMMARY Month:__________

	Rural Refuse		Gate Refuse		City Refuse		Other Residential		Commercial		Industrial	
DAY	Loads	Lbs.	Loads	Lbs.	Loads	Lbs.	Loads	Lbs.	Loads	Lbs.	Loads	Lbs.
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
TOTALS												
TOTAL WT. (TonBasis)												

APPENDIX C

Specificiations for Stationary
and
Mobile Containers

LEE COUNTY SOLID WASTE MANAGEMENT PROJECT

Specifications for Stationary Containers

Forty-three (43) low top and end loading six cubic yard stationary containers to be used with specified front loading unit. Maximum height of 60". The container will have 12 gauge walls, 10 gauge bottom and 16 gauge split top lids. The pick-up lids will be provided with adequate hinges and springs. End doors will have minimum dimensions of 27-7/8" high by 30 wide. The containers will be equipped with a drain plug flush to the bottom. All container will be steam-cleaned prior to painting, all welds will be chipped and wire-brushed. Containers will be painted with at least two heavy coats of air dry paint or equivalent. Color to be selected by owner.

Supplier shall specify delivery date for equipment.

The failure of the County to specifically ask for items that are considered to be of the manufacturer's standard design will not relieve the manufacturer of the responsibility of furnishing these items. The design furnished shall be of the latest as furnished by the bidder under similar contracts.

LEE COUNTY SOLID WASTE MANAGEMENT PROJECT

Specifications for Train Type Containers

Sixty-one (61) train type containers, each with capacity not less than five cubic yards. Containers shall be constructed of hot rolled steel sheets. Side walls to be a minimum of 12 gauge and bottom to be of 10 gauge minimum thickness American made steel. Container shall be equipped with adequately braced alcoves for a two point side pickup. All seams shall be continuously welded and container shall be water-tight.

Loading height of the container above ground level shall not exceed 56.5 inches. Axle clearance shall be a minimum of 8 inches.

Each container shall be equipped with a 2" ball type trailer hitch in front and a 2" diameter ball in rear. Hitches shall be of the slip coupling type as manufactured by the Hammerblow Company.

Tires shall be 900 x 14 Flotation type. Axle shall be a minimum of 2" square drop forged design, Track shall be 72", and axle shall be rated at a minimum of 3000 pounds. One wheel locking nut per wheel (Keyed alike) shall be furnished.

A full width grip strut riding step shall be provided across the forward bottom of the container. Step should pass over the tongue to act as additional reinforcing of the tongue. Grab handles shall be provided for the ridder.

A solid metal hinged lid with two flip type lids on each end (total 4) shall be provided for each container.

Containers shall be chipped free of all slag and weld splatters and finished with two coats of high quality industrial enamel, color to be selected by Owner.

The container shall be equipped with a 1" drain plug flush to the bottom.

The container shall be equipped with two reflector type lights on the rear.

Turn signals, brake, tail lights & tag bracket complete with connection to the pickup wiring shall be provided; also, connection to the rear of the containers so that more than one can be hooked in tandem.

Anchor Post & lock (Keyed alike) for each shall be provided. - See detail.

Supplier shall specify delivery date for equipment.

The failure of the County to specifically ask for items that are considered to be of the manufacturer's standard design will not relieve the manufacturer of the responsibility of furnishing these items. The design furnished shall be of the latest as furnished by the bidder under similar contracts.